CHAPTER 4
FUEL SYSTEM/CARBURETION

Jetting Guidelines 4.1
Main Jet Selection 4.1
Fuel and Oil Tank Asm. Exploded View, 2 Cycle . . 4.2
Fuel Tank Asm. Exploded View, 4 Cycle 4.3
Fuel Flow Diagrams 4.4
Main Jet / Pilot Jet Part Numbers 4.5

2 Cycle Section

Carburetor Component Function (2 Cycle) . . . . . 4.6 - 4.9
Carburetor Circuit Operation (2 Cycle) . . . . . 4.10 - 4.15
Carburetor Vent Systems (2 Cycle) 4.16
Float Height Adjustment (2 Cycle) 4.16
Needle and Seat Leakage Test (2 Cycle) 4.16
Exploded View, Mikuni VM 30 / 34 SS Carburetor 4.17

4 Cycle Section

CV Carburetor System Function (4 Cycle) 4.18
CV Carburetor Vent System (4 Cycle) 4.18
CV Carburetor Operation . . . . . 4.19 - 4.21
Exploded View, Mikuni BST 34 Carburetor 4.22
Exploded View, Mikuni BST 40 Carburetor 4.23
Disassembly Notes, CV Carburetor . . . . . 4.24 - 4.25
Cleaning, CV Carburetor 4.26
Inspection, CV Carburetor 4.27
Assembly, CV Carburetor 4.28
Adjustment, CV Carburetor . . . . . 4.29 - 4.30

Fuel Pump

Fuel Pump Disassembly / Inspection / Assembly . 4.31
Fuel Pump Exploded View 4.32
Troubleshooting . . . . . 4.33 - 4.34

Jetting Guidelines

Changes in altitude and temperature affect air density, which is essentially the amount of oxygen available for combustion. In low elevations and cold temperatures, the air has more oxygen. In higher elevations and higher temperatures, the air is less dense.

Carburetors on Polaris ATV and 6x6 vehicles are calibrated for an altitude of 0-3000 ft. (0-900 meters) and ambient temperatures between +40 and +80° F (+5° to +26° C). Carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all altitudes and/or temperatures. In addition, air screw / pilot screw adjustments may be required to suit operating conditions.

CAUTION:

A main jet that is too small will cause a lean operating condition and may cause serious engine damage. Select the correct main jet carefully for elevation and temperature according to the charts in the General/ Specifications Chapter, or in the Owner's Safety and Maintenance Manual for each particular model.

Air Screw (2 Cycle) / Pilot Screw (4 Cycle) Adjustment

NOTE: Maximum engine efficiency and horsepower are directly related to proper carburetor and clutch settings. The jetting charts should be used as a guideline for selecting optimum jetting for varying temperature and altitude conditions. Air screw or fuel screw adjustment will affect mixture from approximately idle to 1/4 throttle setting. Refer to Maintenance Chapter 2 for complete adjustment procedure, and the following guidelines for minor altitude adjustments.

Air Screw (2 stroke models)

Turn the air screw in (clockwise) 1/4 turn for each 30° below 60° F. Turn the air screw out (counterclockwise) 1/4 turn for each 30° above 60° F.

Fuel Screw (4 stroke models)

Turn the fuel screw in (clockwise) 1/4 turn for each 30° above 60° F. Turn the fuel screw out (counterclockwise) 1/4 turn for each 30° below 60° F.

Main Jet Selection

IMPORTANT: The following guidelines must be followed when establishing a main jet setting:

1. Select the lowest anticipated temperature at which the machine will be operated.
2. Determine the lowest approximate altitude at which the machine will be operated.
3. Select the correct main jet from the chart.
4. Clutching changes may also be required for changes in elevation. Refer to clutching charts in General / Specifications Chapter 1 for recommendations.

MODEL: 500 6X6

MODEL NUMBER: . A99AE50AA

ENGINE MODEL: .. EH50PLE06

CARBURETION

Type ..... BST 34 Mikuni
Main Jet 140
Pilot Jet 40
Jet Needle 4D33-3
Needle Jet Q-6
Throttle Valve ..... #100
Pilot Screw 2
Pilot Air Jet 160
Valve Seat 1.5
Fuel Octane (R+M/2) . 87 Non-Oxygenated or 89 Oxygenated

EXAMPLE ONLY (Refer to Chapter 1)

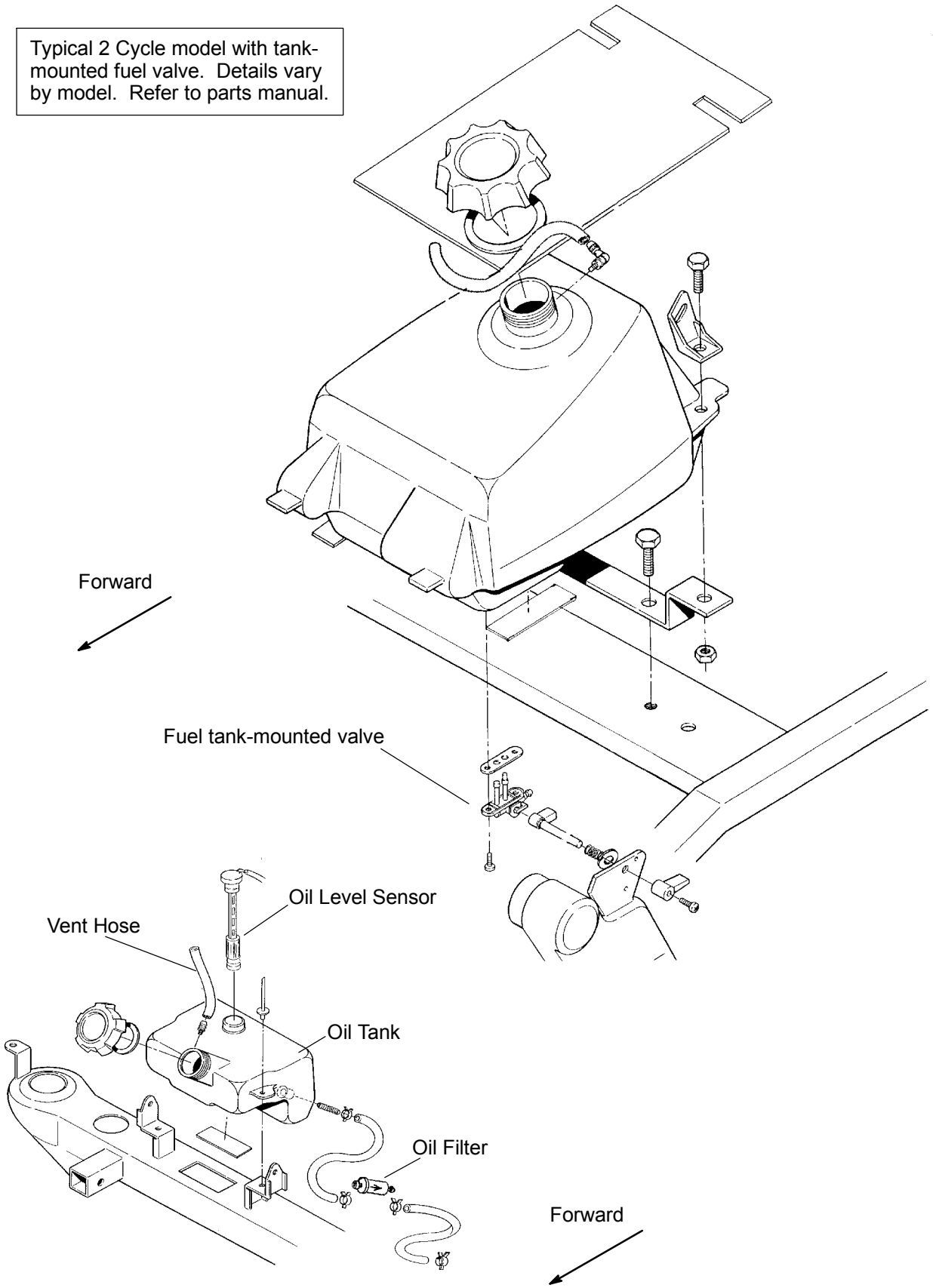
Production Main Jet outlined in BOLD

JETTING CHART

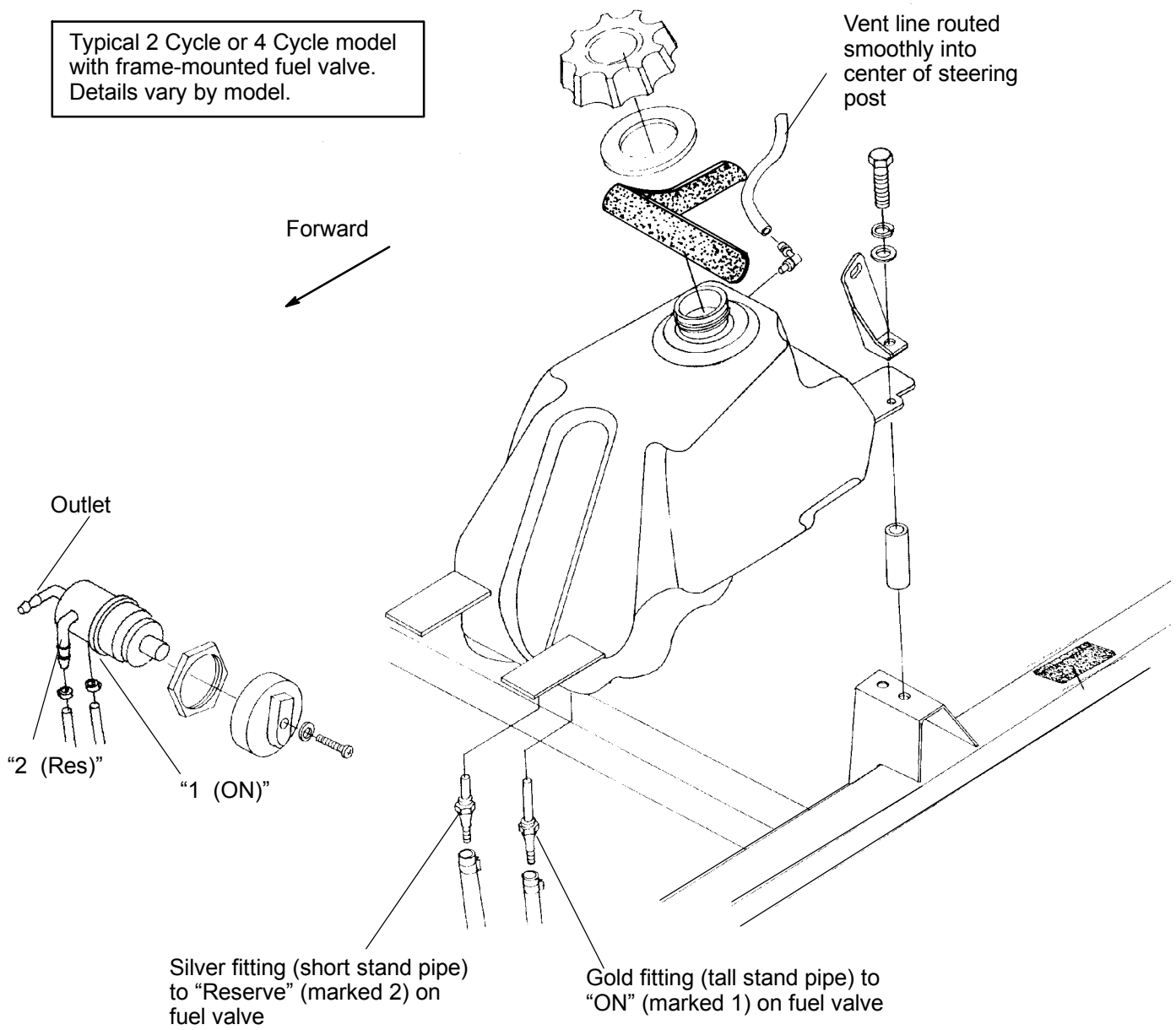
Altitude		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	Above +80°F Above +26°C
Meters (Feet)	0-900 (0-3000)	150	145	**140**	135
	900-1800 (3000-6000)	145	140	135	130
	1800-2700 (6000-9000)	137.5	135	130	122.5
	2700-3700 (9000-12000)	132.5	127.5	122.5	117.5

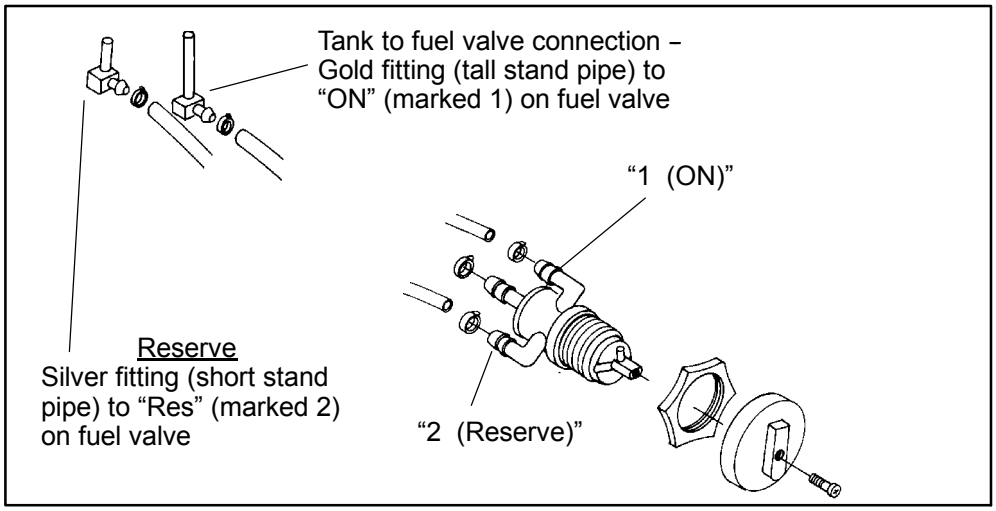
- Pilot screw in 1/2 turn

Typical 2 Cycle model with tank-mounted fuel valve. Details vary by model. Refer to parts manual.

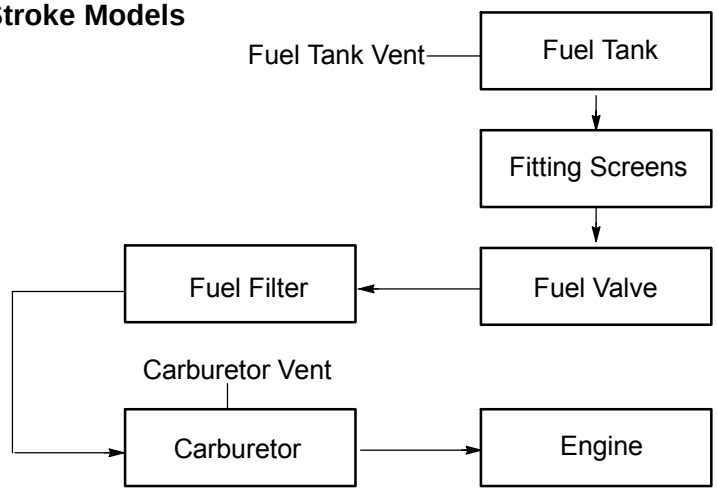


Typical 2 Cycle or 4 Cycle model with frame-mounted fuel valve. Details vary by model.

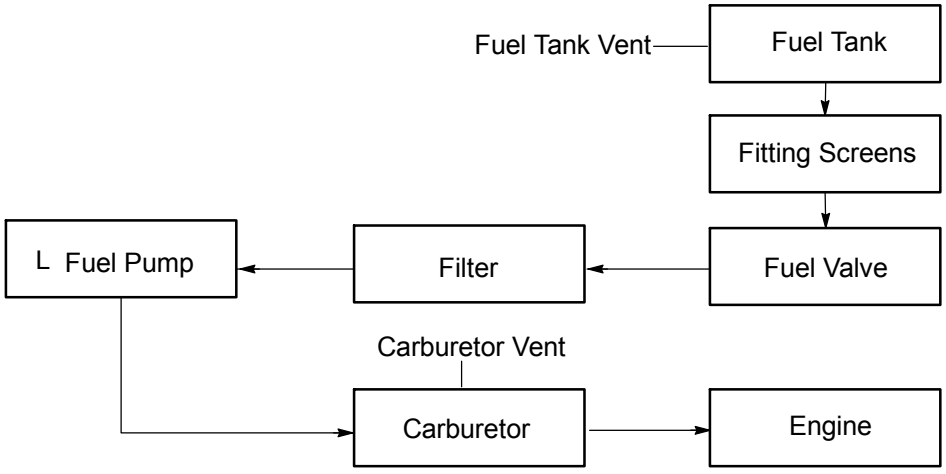

Vent line routed smoothly into center of steering post
Forward
Outlet
"2 (Res)"
"1 (ON)"
Silver fitting (short stand pipe) to "Reserve" (marked 2) on fuel valve
Gold fitting (tall stand pipe) to "ON" (marked 1) on fuel valve


Tank to fuel valve connection – Gold fitting (tall stand pipe) to "ON" (marked 1) on fuel valve
"1 (ON)"
Reserve
Silver fitting (short stand pipe) to "Res" (marked 2) on fuel valve
"2 (Reserve)"

Fuel System Diagram - 2 Stroke Models



Fuel System Diagram - 4 Stroke Models



L 325 / 425 Under Headlamp Cover
335 / 500 Above Oil Tank

Pilot Jets Part Numbers
Mikuni VM (2 Cycle)

Jet No.	Part No.
30	3130331
35	3130066
40	3130067
45	3130068
50	3130069

Hex Main Jet Part Numbers
Mikuni VM (2 Cycle)

Jet No.	Part No.
110	3130105
115	3130106
120	3130107
125	3130108
130	3130109
135	3130110
140	3130111
145	3130112
150	3130113
155	3130114
160	3130115
165	3130116
170	3130117
175	3130118
180	3130119
185	3130120
190	3130121
195	3130122
200	3130123
210	3130124
220	3130125
230	3130126
240	3130127
250	3130128
260	3130129
270	3130130
280	3130131
290	3130132
300	3130133
310	3130134
320	3130135

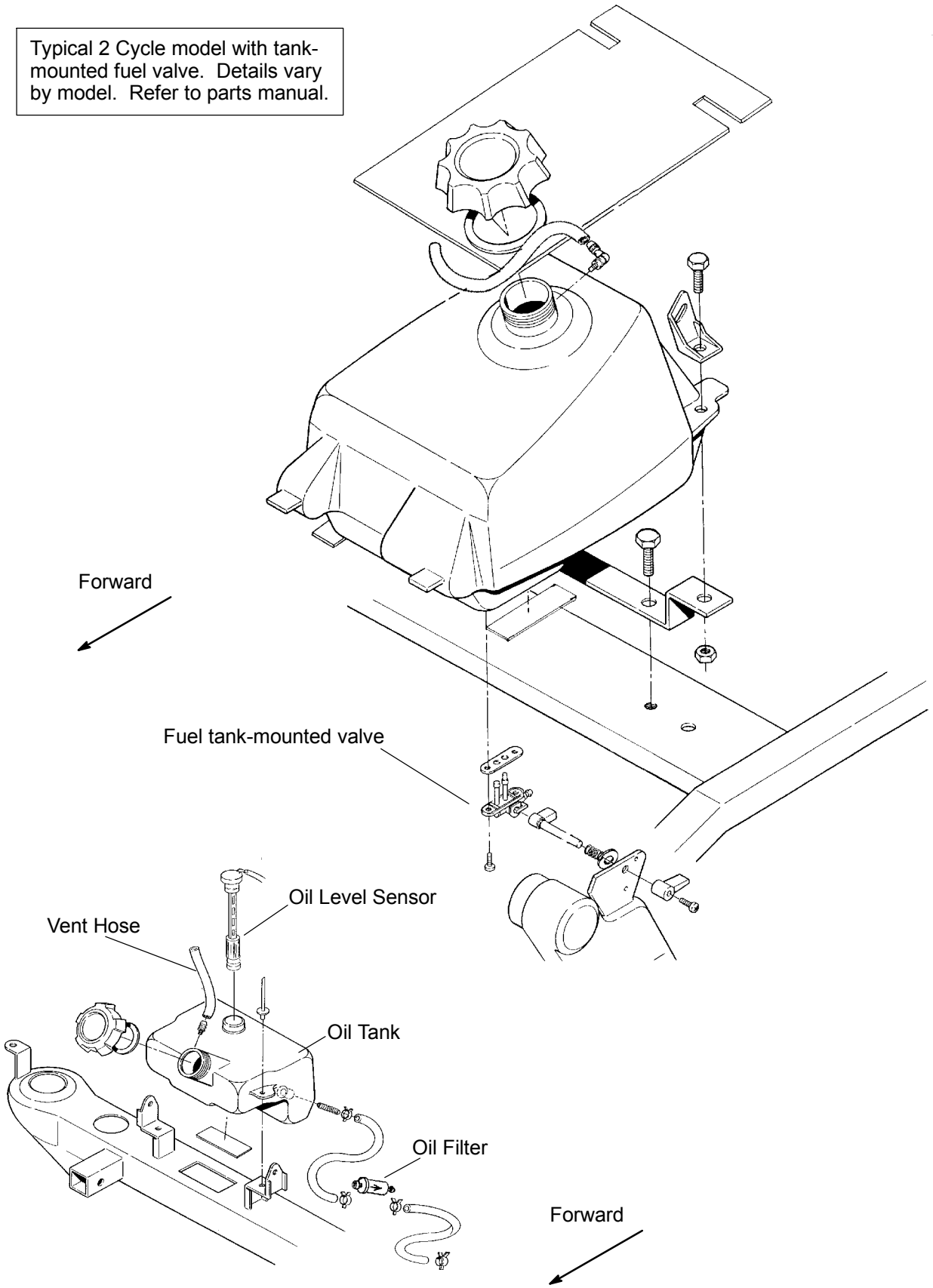
Main Jet Part Numbers (4 Cycle)
Mikuni BST Carburetor

Jet Number	Part Number
112.5	3130554
115	3130555
117.5	3130556
120	3130557
122.5	3130558
125	3130559
127.5	3130560
130	3130561
132.5	3130562
135	3130563
137.5	3130564
140	3130527
142.5	3130566
145	3130567
147.5	3130568
150	3130569
152.5	3130570
155	3130571
157.5	3130572
160	3131141
162.5	3131142
165	3131143
167.5	3131144
170	3131145

Pilot Jet Part Numbers (4 Cycle)
Mikuni BST Carburetor

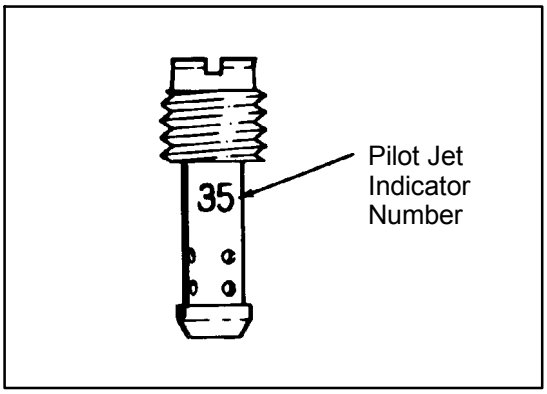
Jet Number	Part Number
40.0	3130624
42.5	3130526

Typical 2 Cycle model with tank-mounted fuel valve. Details vary by model. Refer to parts manual.



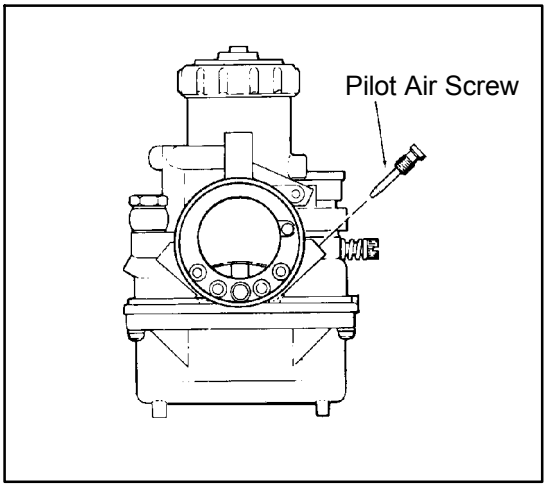
Pilot Jet

From idling to low speeds, the fuel supply is metered by the pilot jet. There are several air bleed openings in the sides of the pilot jet which reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval under a given set of conditions.



Pilot Air Screw

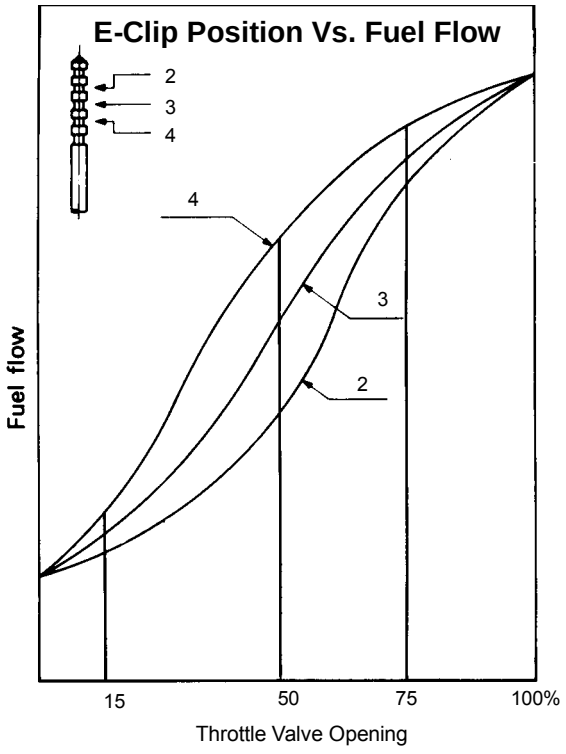
The pilot air screw controls the fuel mixture from idle to low speeds. The tapered tip of the air screw projects into the air passage leading to the pilot jet air bleeds. By turning the screw in or out, the cross sectional area of the air passage is varied, in turn varying the pilot jet air supply and changing the mixture ratio.



Air/Fuel Mixture Ratio

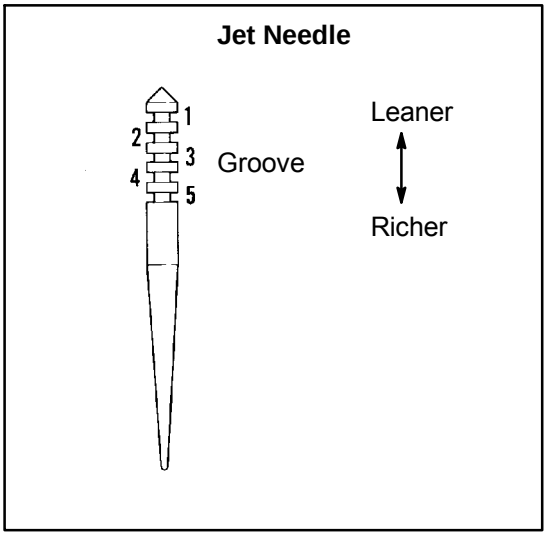
A carburetor with a piston type throttle valve is also called a variable venturi type carburetor. In this type of carburetor, the needle jet and jet needle serve to control a proper air/fuel mixture ratio at the medium throttle valve opening (between 1/4 and 3/4 opening). Having the proper needle jet and jet needle has a major impact on engine performance at partial load.

The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" ring inserted into one of the five slots provided in the head of the jet needle. The chart at right shows the variation of fuel flow based on the height of the "E" ring.



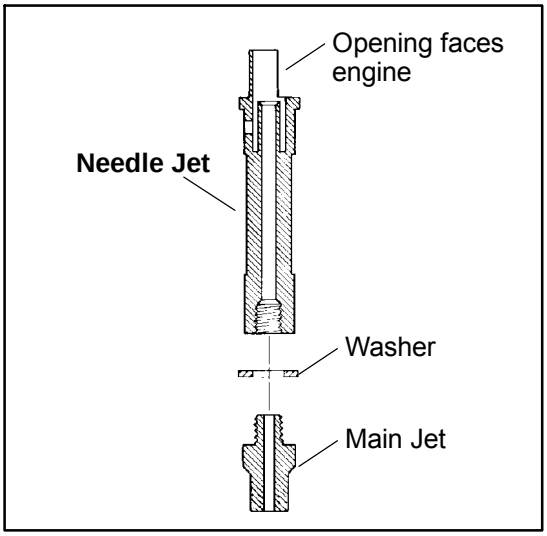
Jet Needle

The jet needle has five adjustment grooves cut into the upper portion, and is tapered from approximately the middle of the needle to the lower end. The top is fixed to the center of the throttle valve by the needle clip, and the tapered end extends into the needle jet. Fuel flows through the space between the needle jet and jet needle. This space does not vary until the throttle reaches the 1/4 open point. At that time the tapered portion of the needle begins to move out of the jet, affecting fuel flow as the opening enlarges. If the needle clip is changed from the standard position to a lower groove, the needle taper starts coming out of the jet sooner, resulting in a richer mixture. Moving the clip higher produces a leaner mixture. If the taper is worn due to vibration, fuel flow may be significantly affected.



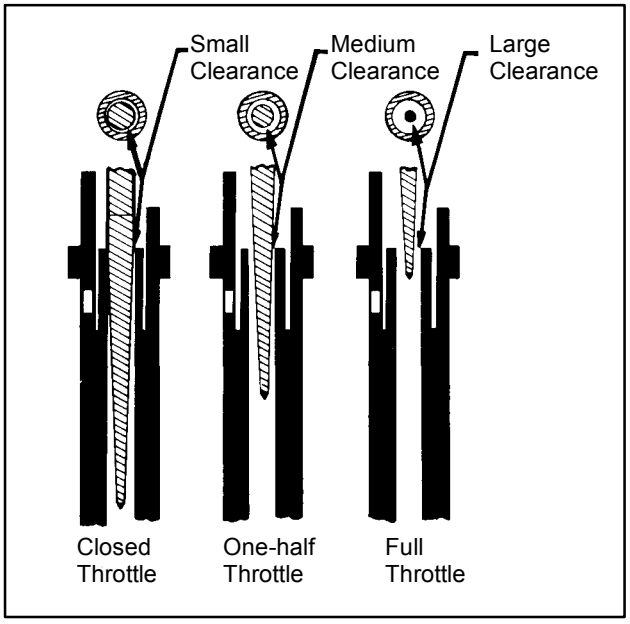
Needle Jet

The needle jet works in conjunction with the jet needle to regulate fuel flow rate. An air bleed opening in the side of the needle jet brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet. Mixing is augmented by a projection at the needle jet outlet, called the primary choke. The letter number code stamped on the jet indicates jet inside diameter.



Throttle Opening vs. Fuel Flow

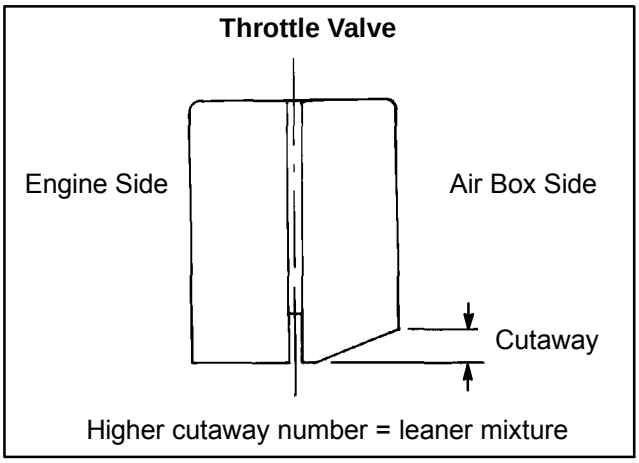
In a full throttle condition the cross sectioned area between the jet needle and the needle jet is larger than the cross sectioned area of the main jet. The main jet therefore has greater control over fuel flow.



Throttle Valve

The throttle valve controls the rate of engine air intake by moving up and down inside the main bore. At small throttle openings, air flow control is performed chiefly by the cutaway. By controlling air flow the negative pressure over the needle valve is regulated, in turn varying the fuel flow.

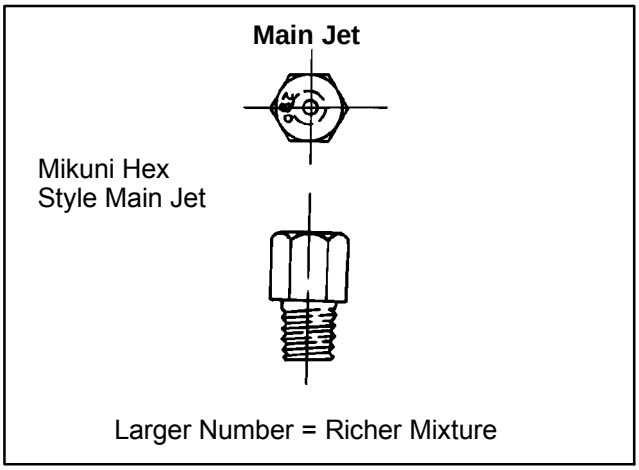
The throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. The higher the number, the leaner the gasoline/air mixture.



Main Jet

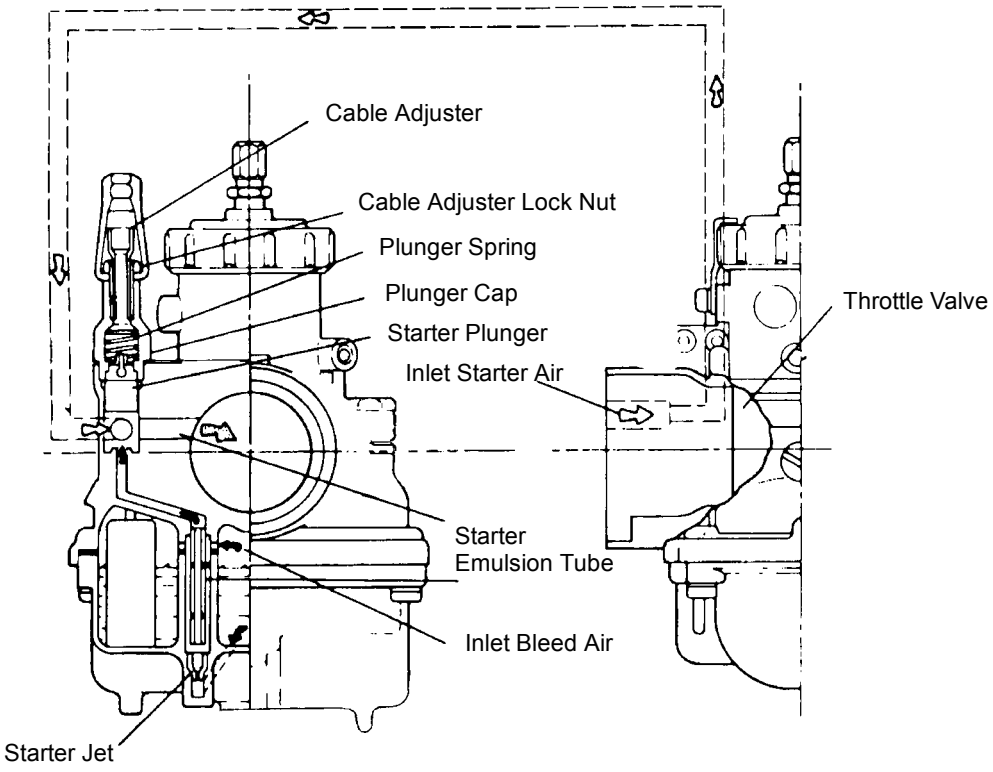
When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel CCs which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow, resulting in a richer mixture.

Main jets are screwed directly into the needle jet base.



FUEL SYSTEM/CARBURETION
Starter System - Closed Throttle (2 Cycle)

Mikuni carburetors use a starter system rather than a choke. In this type of carburetor, fuel and air for starting the engine are metered with entirely independent jets. The fuel metered in the starter jet is mixed with air and is broken into tiny particles in the emulsion tube. The mixture then flows into the plunger area, mixes again with air coming from the air intake port for starting and is delivered to the engine through the fuel discharge nozzle in the optimum air/fuel ratio. The starter is opened and closed by means of the starter plunger. The starter type carburetor is constructed to utilize the negative pressure of the inlet pipe, so it is important that the throttle valve is closed when starting the engine.

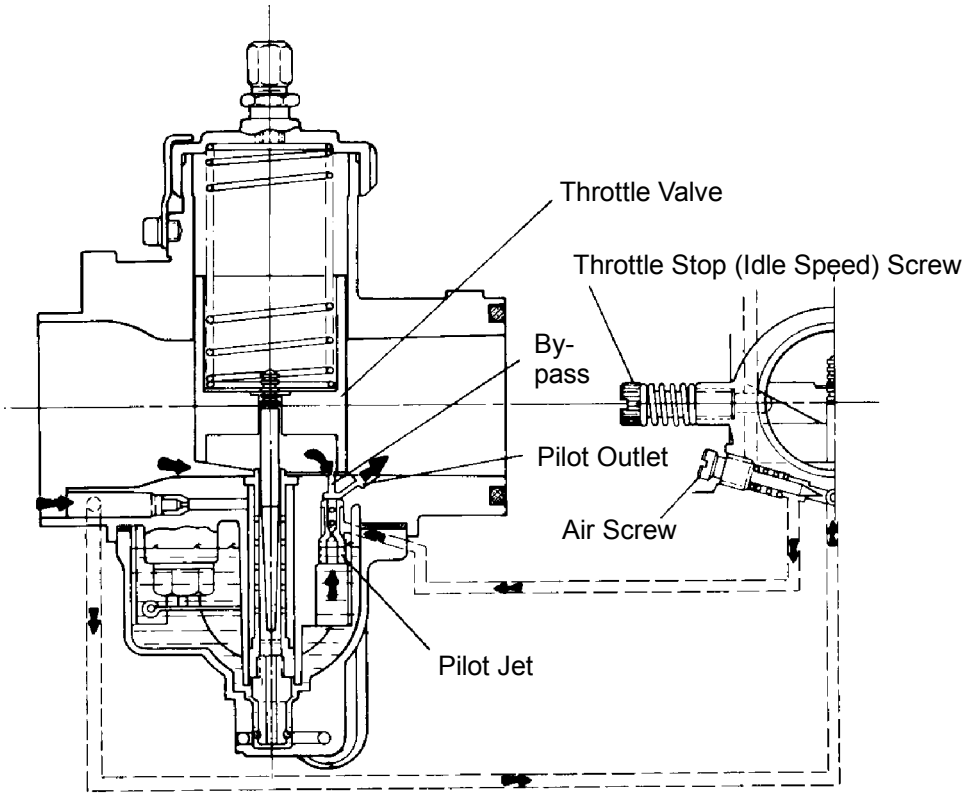


Pilot System (0-3/8 Throttle) (2 Cycle)

The pilot system's main function is to meter fuel at idle and low speed driving. Though its main function is to supply fuel at low speed, it does feed fuel continuously throughout the entire operating range.

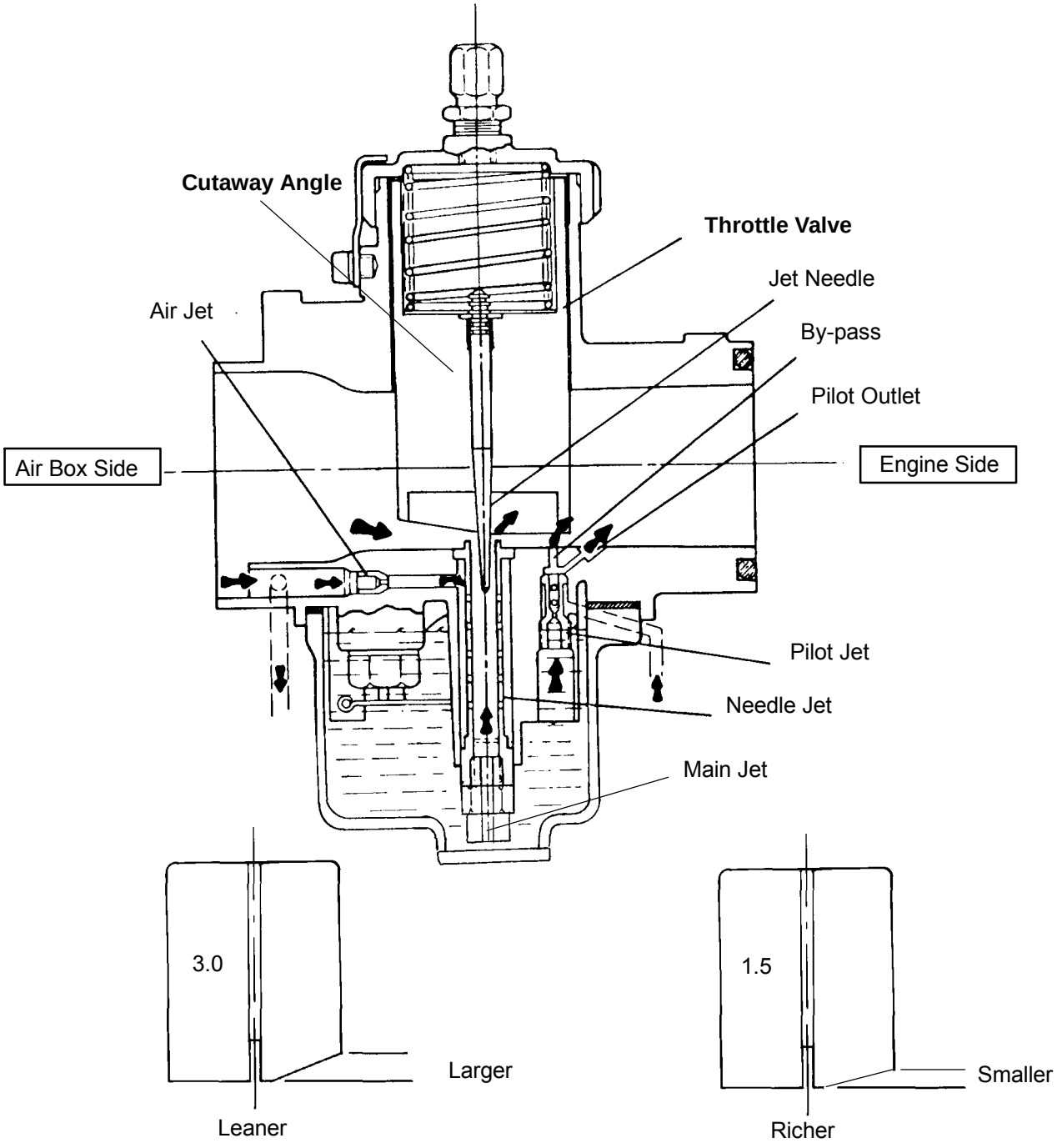
Fuel for the pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

The mixture is regulated to some degree by adjusting the air screw. When the air screw is closed, the fuel mixture is made richer as the amount of air is reduced. When the air screw is opened, the mixture is made more lean as the amount of air is increased.



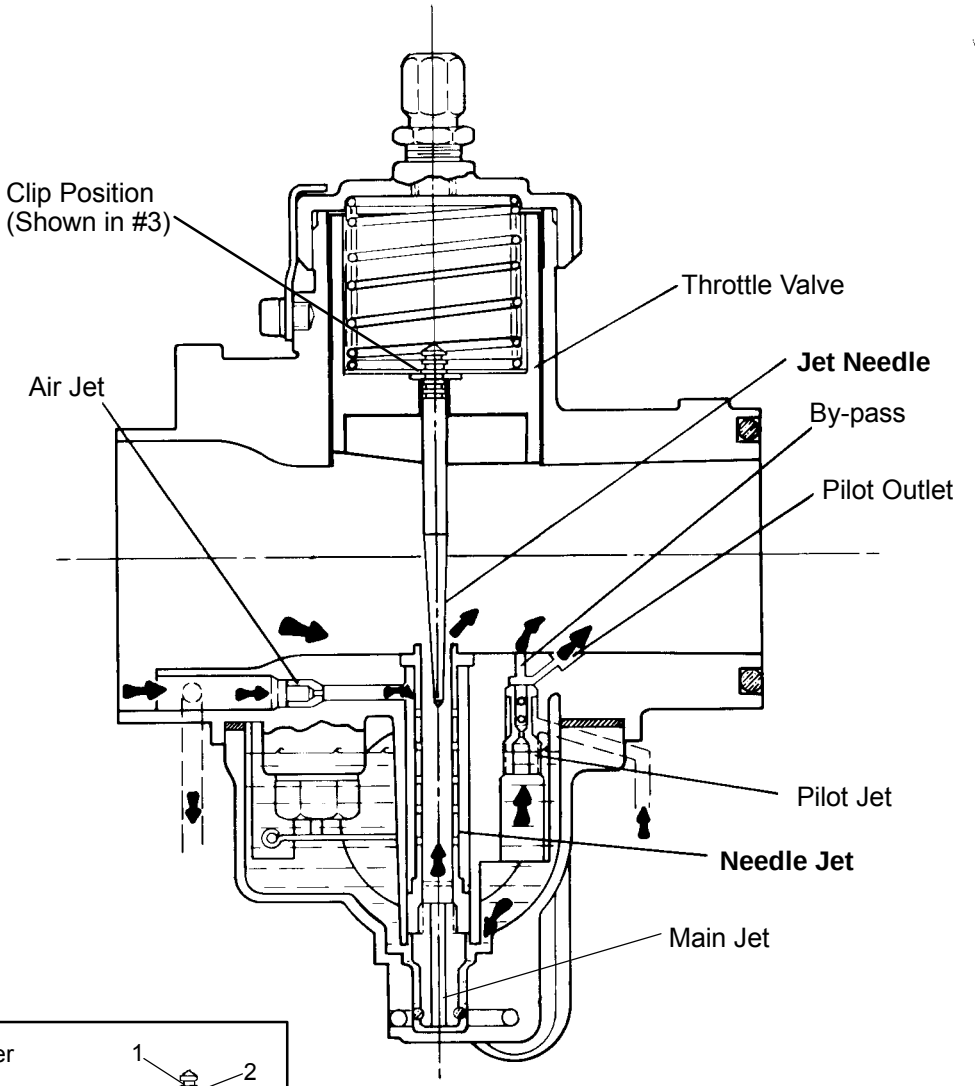
FUEL SYSTEM/CARBURETION
Slide Cutaway (1/8-3/8 Throttle) (2 Cycle)

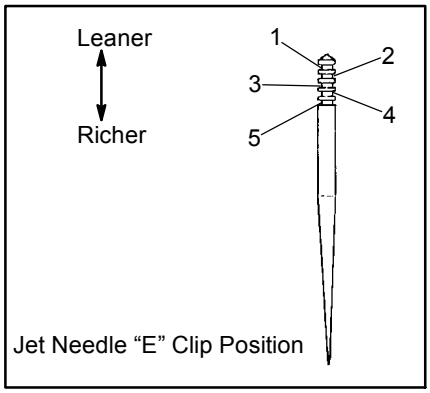
Throttle valve cutaway effect is most noticeable at 1/4 throttle opening. The amount of cutaway is pre-determined for a given engine to maintain a 14:1 air/fuel ratio at part throttle. A steep angle would indicate a fairly lean mixture because there is less resistance to air flow. A flat angle would provide a much richer mixture because there is more resistance to air flow. The venturi shape can be adjusted for each engine's breathing characteristics by using a different valve cutaway angle. A number will be stamped into the bottom of the valve (e.g. 2.5) indicating the size of the cutaway. The higher the number, the steeper the angle.



Jet Needle/Needle Jet (3/8-3/4 Throttle) (2 Cycle)

The jet needle and needle jet have the most effect between 3/8 and 3/4 throttle opening. Some mixture adjustment can be accomplished by changing the location of the “E” clip on the needle. Moving the clip down raises the needle in the jet passage and richens the mixture. Moving the clip up lowers the needle in the jet passage and leans the mixture. Letter and number codes are stamped into the needle and the jet indicating sizes and tapers of each.

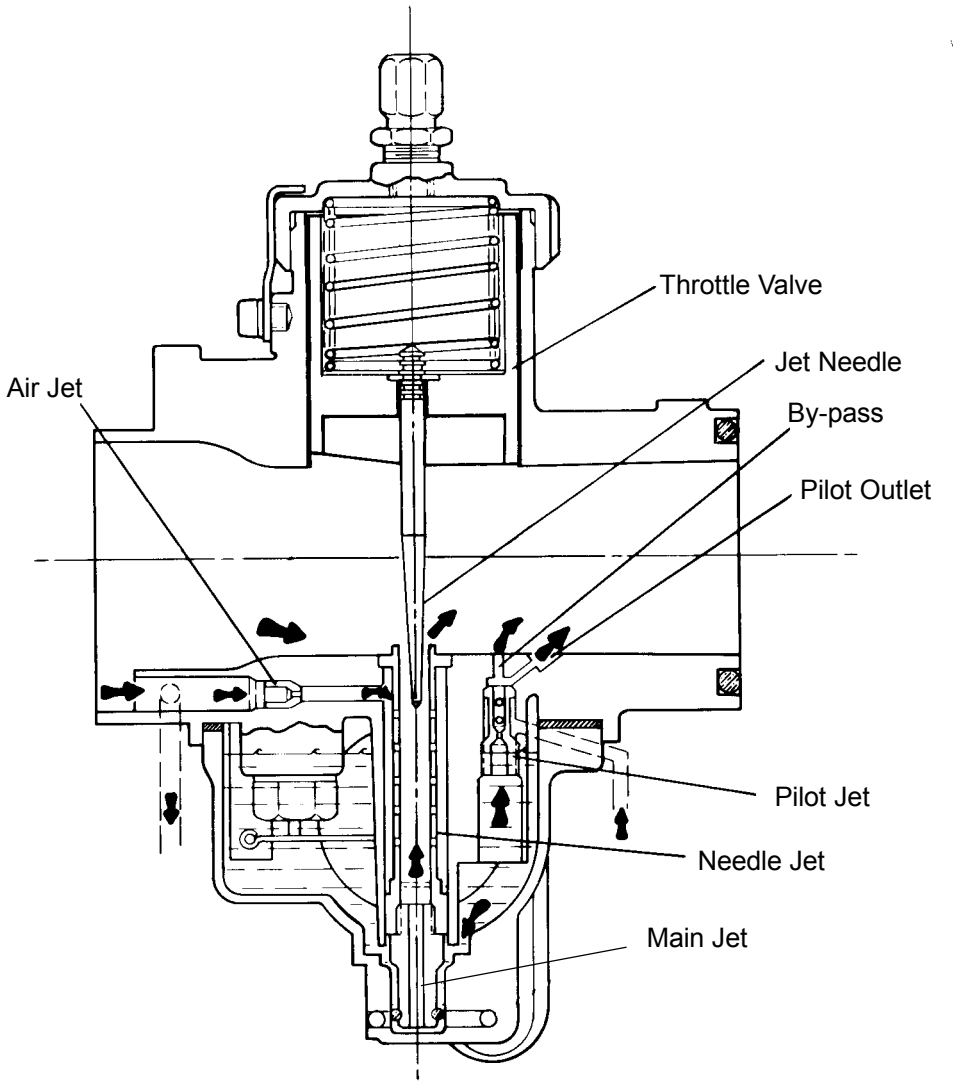




FUEL SYSTEM/CARBURETION
Main System (3/4 to Full Throttle) (2 Cycle)

The main system is designed for delivering fuel between low speed and high speed operation. This system is made up of the jet needle, needle jet, and main jet. The main system begins to take effect as soon as there is enough air flow into the carburetor venturi to draw fuel up through the main jet and needle jet assembly. This system works in conjunction with the needle jet system.

During low speed driving, there is very little clearance between the jet needle and the needle jet; therefore, very little fuel from the main jet can pass between the jet needle and the needle jet. As the throttle valve opening is increased, the tapered jet needle is raised farther out of the needle jet, allowing greater fuel flow. Under full throttle opening, the cross sectioned area of clearance between the jet needle and the needle jet becomes greater than the cross sectioned area of the main jet. Thus the main jet is now controlling the amount of fuel flow.



Mikuni Fuel Delivery (2 Cycle)

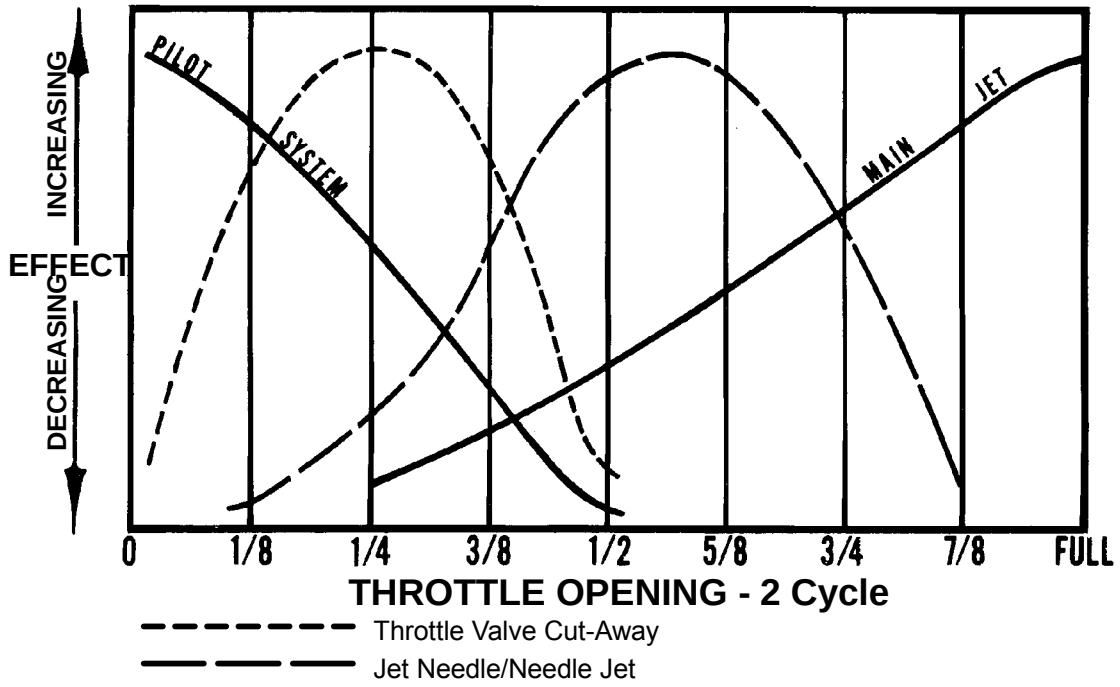
The throttle opening chart below demonstrates component relationship to fuel flow versus throttle valve opening.

The pilot system's main function is that of a low speed jet. Its most effective range of fuel delivery is from idle to approximately 3/8 throttle valve opening.

The throttle valve controls the rate of engine air by its movement up and down in the carburetor venturi. At small throttle openings the air flow is regulated chiefly by the valve cutaway, with greatest effectiveness at 1/4 throttle opening. Throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. Decreasing the cutaway number will increase the amount of fuel delivered in its effective range.

The jet needle and needle jet have an effective operating range from approximately 1/8 to 7/8 throttle opening. The amount of fuel delivered during this range relies upon the jet needle clip position, as well as the needle jet size and other specifications.

The main jet affects fuel delivery at 1/4 throttle and consistently increases to full throttle opening.

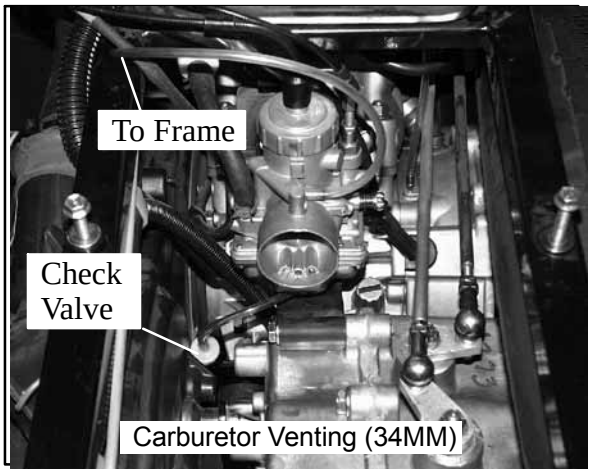


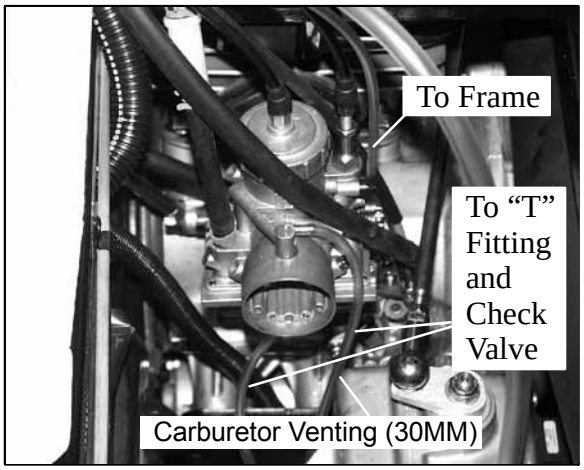
Carburetor Component Function - 2 Cycle			
System	**Main Components**	**Main Function**	**Main Affect**
Float System (Fuel Level Control)	Inlet Pipe, Needle and Seat, Floats, Float Pins	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Vent Passages in Carburetor, Vent line	Supplies atmospheric pressure to fuel in float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Choke Plunger, Return Spring, Carb Passages (Starter Jet, passage in float bowl)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle speeds
Pilot (Idle System)	Pilot Jet/Passageways, Pilot Air Screw with Spring, Bypass Port (Beneath Throttle Slide), Air Jet, Pilot Outlet, Throttle Valve Cutaway	Primarily supplies fuel at idle and low throttle settings	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Passage, Needle Jet, Jet Needle, Throttle Valve	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle

Vent Systems - 2 Cycle

The fuel tank and carburetor float bowl vent lines supply atmospheric pressure to the fuel in the tank and float bowl. The lines must be free of kinks and restrictions to prevent lean mixture and possible engine damage. Vent lines must be properly routed to prevent damage to the line and to prevent contaminants from entering the carburetor or fuel tank.

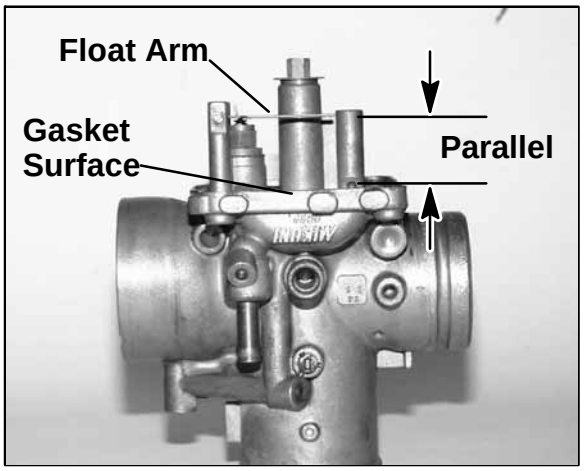
A one-way check valve is in place on the bowl overflow hose, to allow overflow fuel out, and prevent water or other contaminants from entering the bowl. (See photo below right).





Float Height - 2 Cycle

1. Invert the carburetor and remove float bowl.
2. Rest the float tongue lightly on the inlet needle valve pin without compressing the spring.
3. Measure height from float bowl mating surface to float arm as shown. Both sides of float arm must be parallel to each other. Use float adjustment tool (PN 2872314) or a vernier caliper. When measuring height, be sure inlet needle valve spring is not compressed. If adjustment is necessary, bend the tongue slightly.



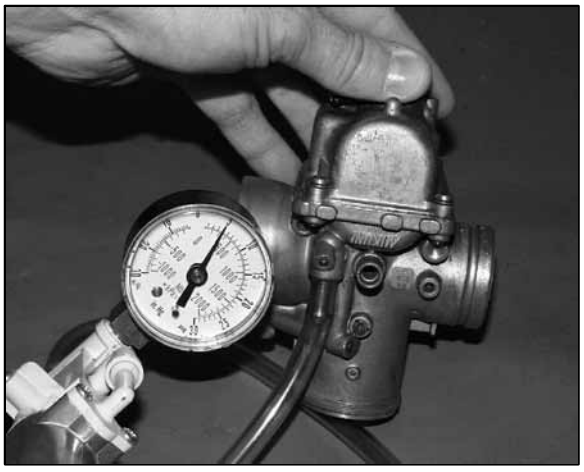
Float Height:

VM 30 Parallel to Gasket Surface ± 1mm

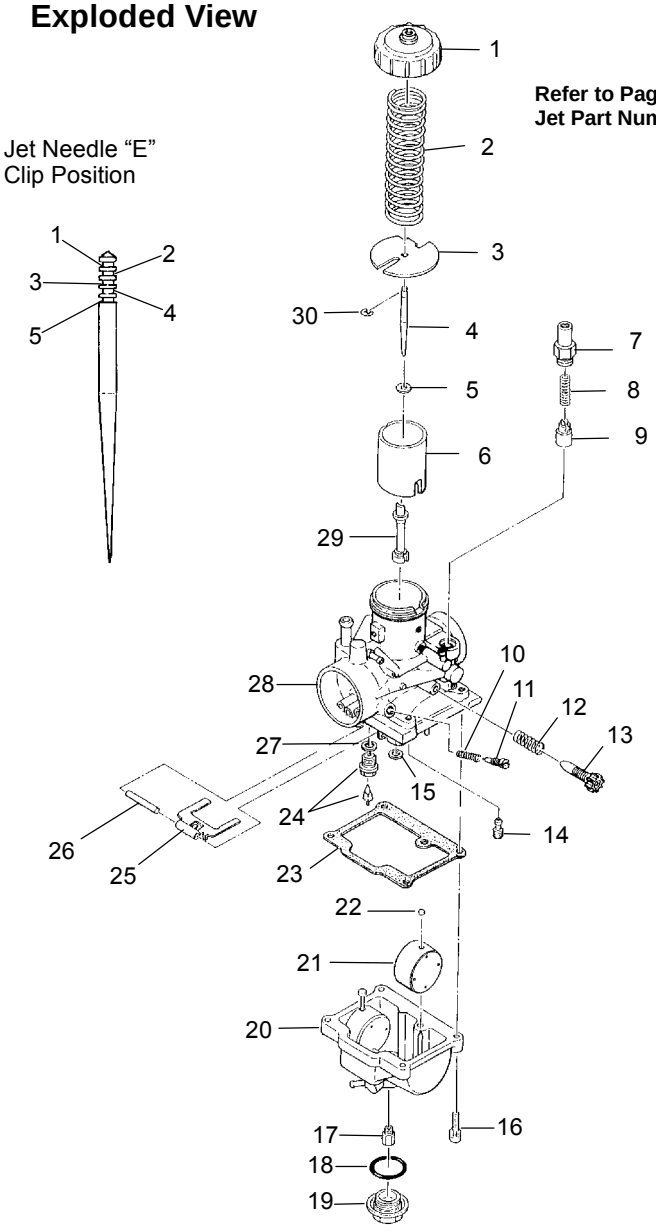
VM 34 Parallel to Gasket Surface ± 1mm

Needle and Seat Leakage Test - 2 Cycle

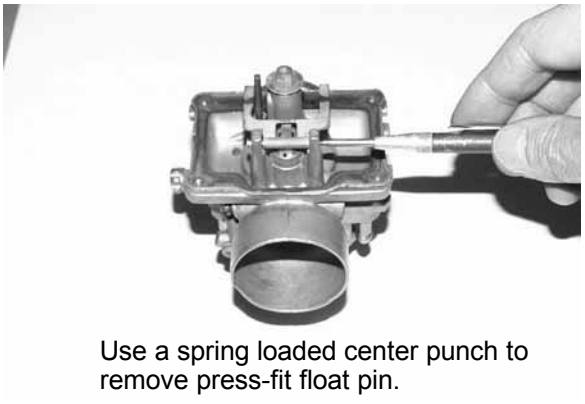
1. Install the float bowl. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring or gasket.



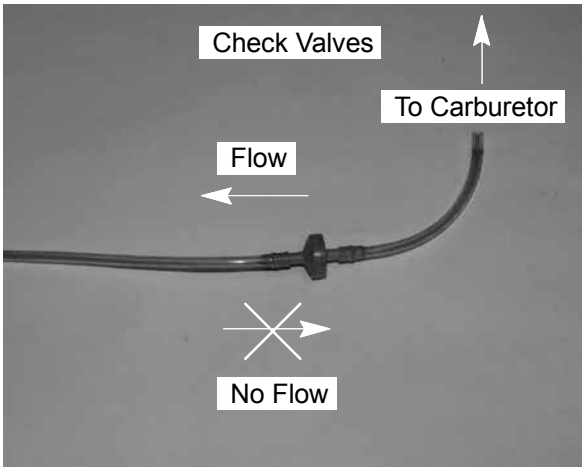
2 Cycle
Mikuni VM30SS / VM34SS Carburetor
Exploded View



1. Cap
2. Spring
3. Plate, Cable Retainer
4. Jet Needle
5. Washer
6. Valve, Throttle
7. Cap, Plunger
8. Spring
9. Starter Plunger
10. Spring, Air Adj. Screw
11. Screw, Air Adjust
12. Spring, Throttle Stop Screw
13. Screw, Throttle Stop
14. Pilot Jet
15. Washer, Main Jet
16. Screw and Washer Assy.
17. Main Jet
18. O-Ring
19. Drain Plug
20. Float Bowl
21. Float
22. Cap
23. Gasket
24. Valve, Inlet Needle
25. Arm, Float
26. Pin, Float
27. Gasket, Inlet Valve
28. Carb Body Assy. (1-30)
29. Needle Jet
30. E-Clip



Use a spring loaded center punch to remove press-fit float pin.

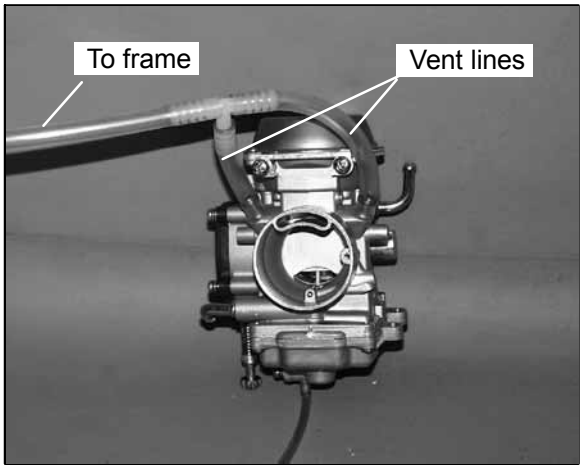


4 Cycle CV Carburetor System Function

Carburetor Component Function - 4 Cycle			
System	**Main Components**	**Main Function**	**Main Affect**
Float System (Fuel Level Control)	Inlet Pipe, Needle and Seat, Float, Float Pin	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Vent Passages in Carburetor, Vent lines (2) into (1) to frame	Supplies atmospheric pressure to fuel in float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Choke Plunger, Return Spring, Carb Passages (Starter Jet, Starter Bleed Pipe)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle
Pilot (Idle System)	Pilot Jet/Passageways, Pilot-Mixture Screw with Spring Washer and Sealing O-Ring, Bypass Ports (Behind Throttle Plate), Pilot Air Jet, Pilot Outlet, Throttle Plate	Primarily supplies fuel at idle and low throttle settings	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Jet, Main Air Passage, Needle Jet, Jet Needle, Vacuum Slide, Throttle Plate	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle

Vent Systems - 4 Cycle CV Carburetor

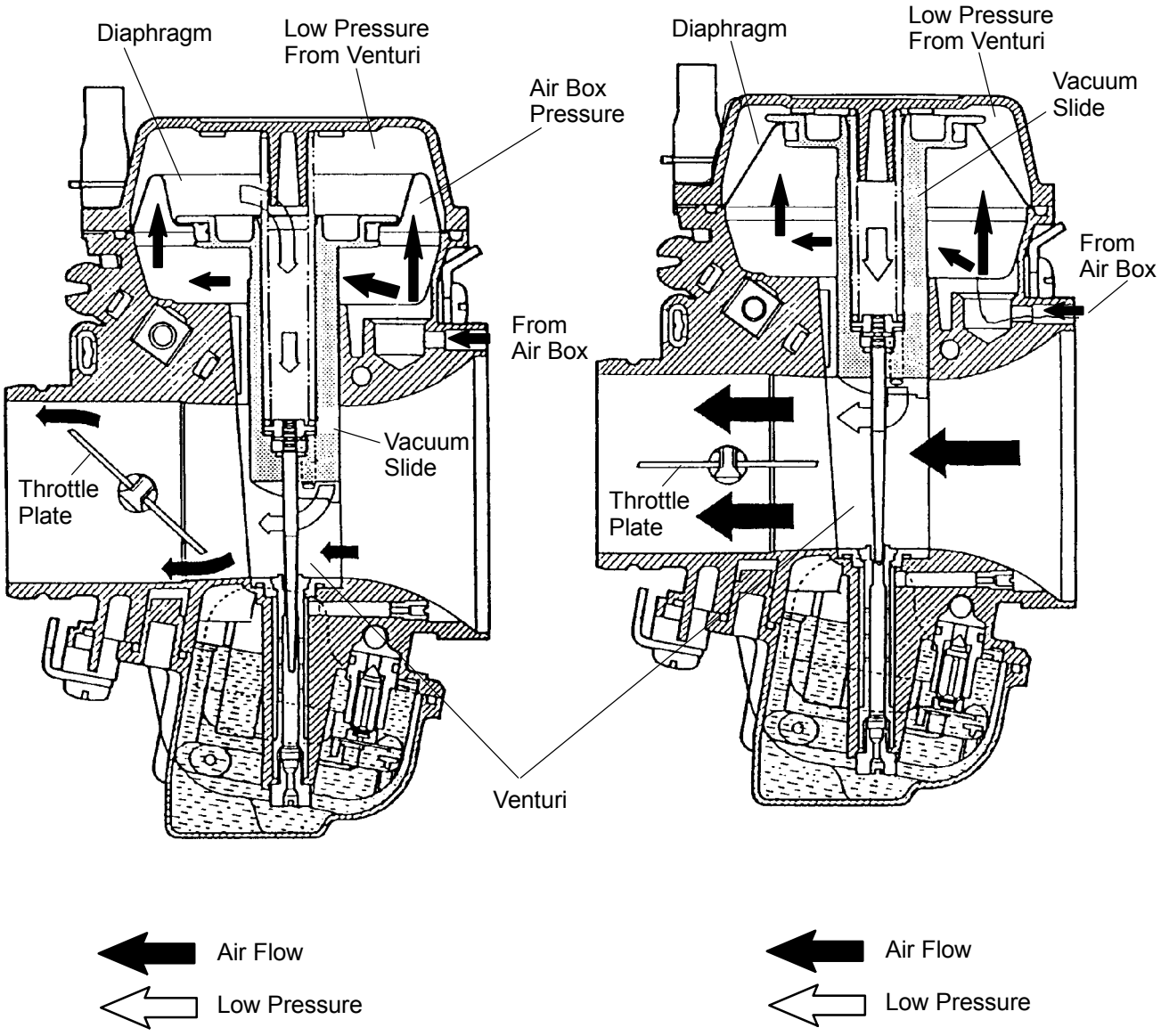
The carburetor float bowl vent lines supply atmospheric pressure to the fuel in the float bowl. The lines must be free of kinks and restrictions and be properly routed to allow fuel to flow in the proper amount and to prevent contaminants from entering the carburetor.



The constant velocity carburetor used on Polaris 4 Cycle ATVs and 6x6 incorporates a mechanically operated throttle plate and a vacuum controlled slide valve (vacuum slide). The venturi cross-sectional area in the carburetor bore is increased or decreased automatically by the vacuum slide, which moves according to the amount of negative pressure (less than atmospheric) present in the venturi.

A diaphragm attached to the top of the vacuum slide is sealed to the slide and to the carburetor body forming two chambers. The chamber above the diaphragm is connected to the venturi area by a drilled orifice in the center of the vacuum slide. The chamber below the diaphragm is vented to atmospheric pressure by a passage on the air box side of the carburetor. A spring, installed in the center of the vacuum slide, dampens the slide movement and assists the return of the slide.

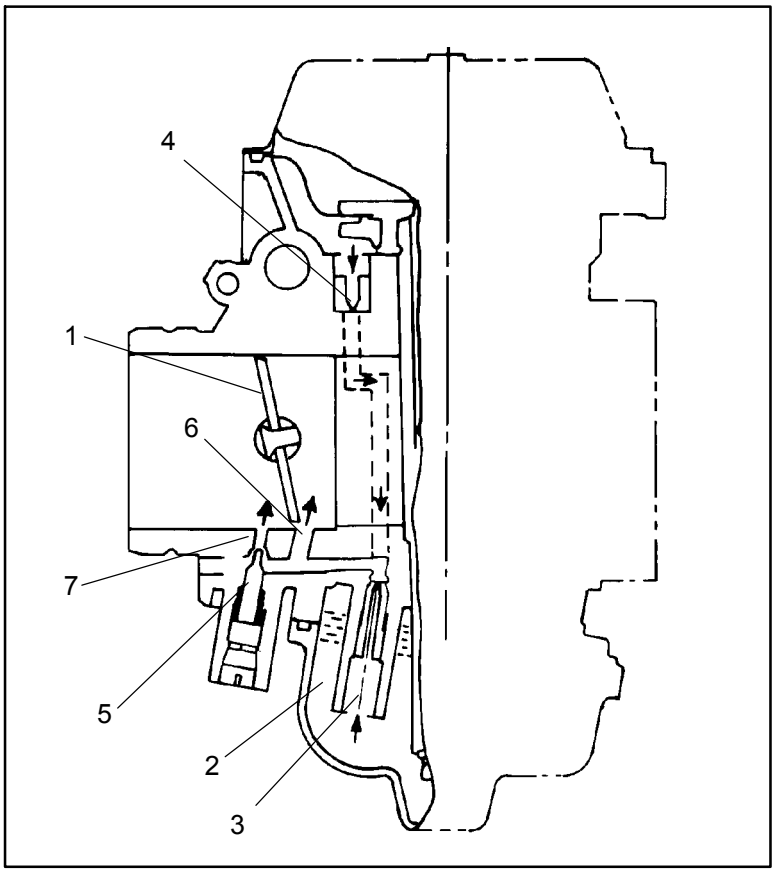
When the throttle plate is opened and engine speed begins to increase, the pressure in the venturi (and therefore in the chamber above the diaphragm) becomes significantly lower than atmospheric. Atmospheric pressure in the chamber below the diaphragm forces the diaphragm upward, raising the slide against spring pressure. When the pressure above and below the diaphragm are nearly equal, the slide moves downward under spring pressure. Raising or lowering the slide increases or decreases the cross sectional area in the venturi, and therefore the air velocity in the venturi is kept relatively constant. This provides improved fuel atomization and optimum fuel/air ratio.



Note: Diagrams are for explanation of theory only, and are not true representations of Mikuni BST 34 / BST 40 carburetor.

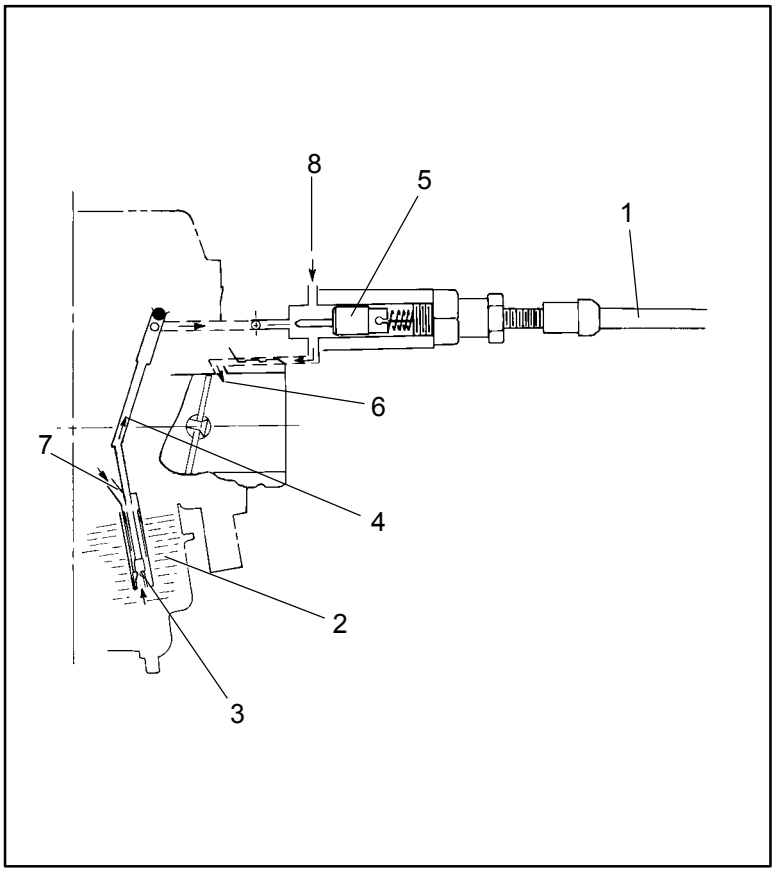
Pilot (Idle and Slow) System

This system supplies fuel during engine operation with throttle valve closed (1) or slightly opened. The fuel from float chamber (2) is metered by pilot jet (3) where it mixes with air coming in through pilot air jet (4). The mixture then goes up through pilot passage to pilot screw (5). A part of the mixture is discharged into the main bore out of bypass ports (6). The remainder is then metered by pilot screw and discharged into the main bore through pilot outlet (7).



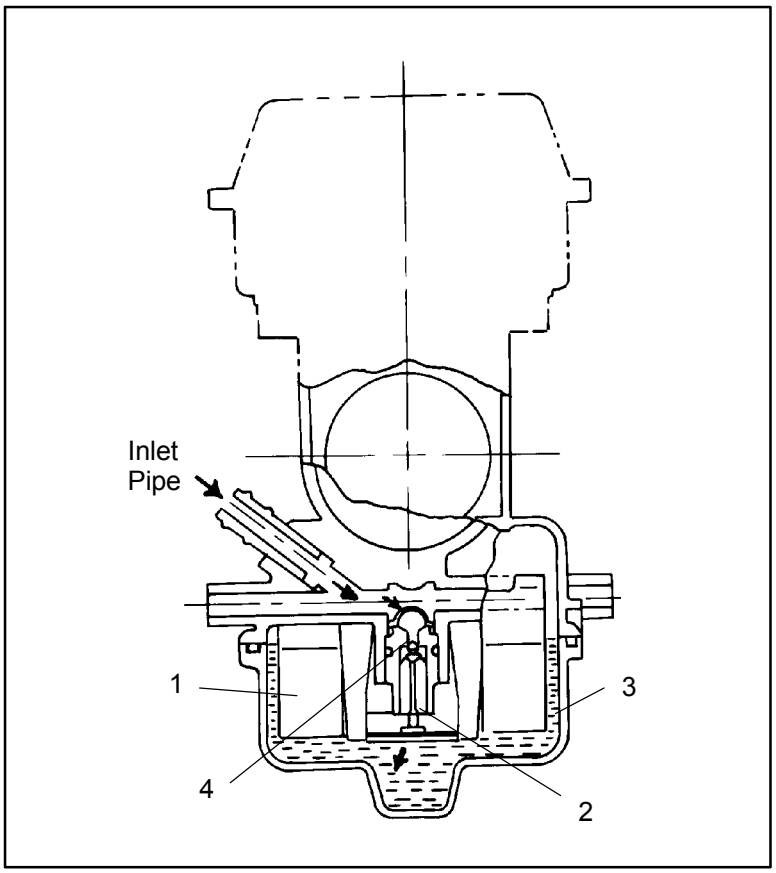
Starter System (Choke or Enrichment)

When the choke cable (1) is activated, the starter plunger (5) is lifted off the seat. Fuel is drawn into the starter circuit from the float chamber (2) through the starter jet (3). Starter jet meters this fuel, which then flows into starter pipe (4) and mixes with the air (7) coming from the float chamber. The mixture, rich in fuel content, reaches starter plunger and mixes again with the air coming through a passage (8) extending from underneath the diaphragm. The rich fuel/air mixture for starting is discharged through starter outlet (6) in the the main bore.



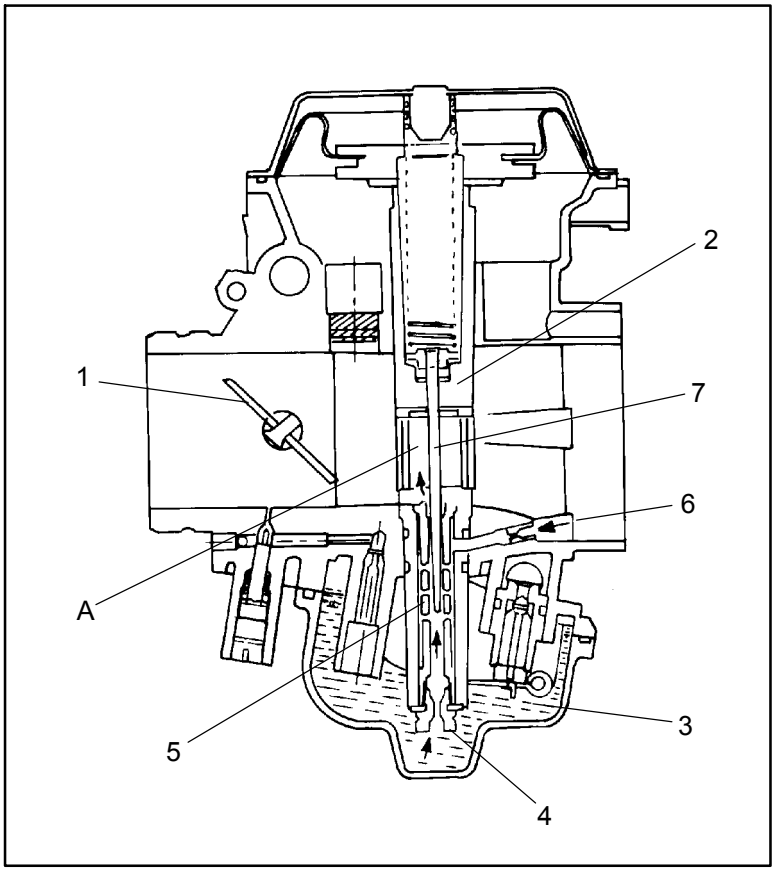
Float System

Fuel enters the float chamber (3) by means of the inlet pipe and passage, through a screen on the back of the inlet needle seat (4), and around the inlet needle (2). As the fuel fills the float chamber, the float (1) rises and forces the inlet needle against the seat, shutting off the orifice in the seat. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber. As the fuel level falls, floats go down and needle valve unseats itself to admit fuel into the chamber. In this manner, the needle valve admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber.

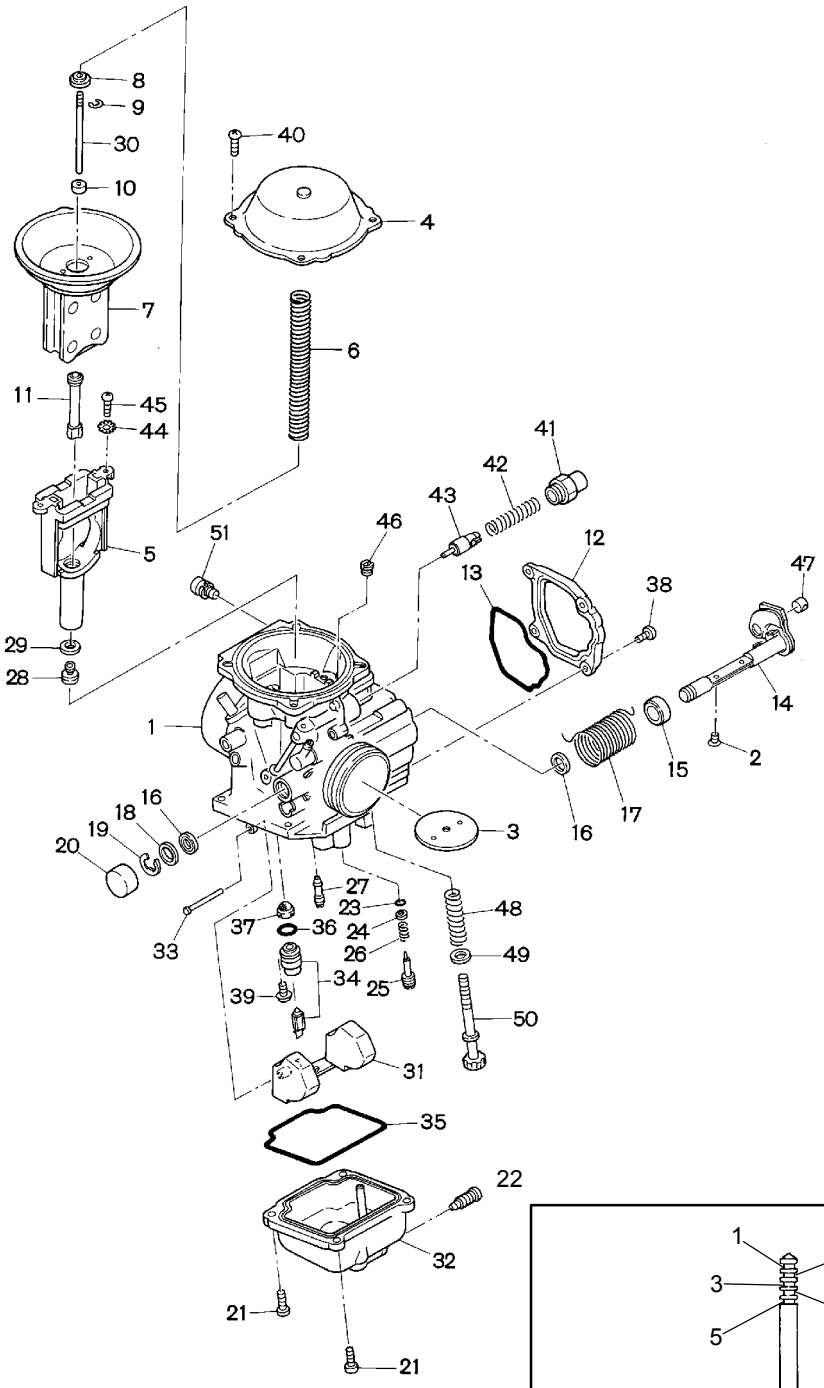


Main System

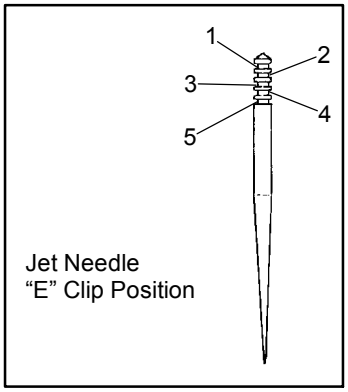
As throttle valve (1) is opened, engine speed rises, and this increases negative pressure in the venturi. Consequently the vacuum slide (2) moves upward. The fuel in float chamber (3) is metered by main jet (4), and the metered fuel enters needle jet (5), in which it mixes with the air admitted through main air jet (6) to form an emulsion. The emulsified fuel then passes through the clearance between needle jet (5) and jet needle (7), and is discharged into the venturi (A). Mixture proportioning is accomplished in needle jet (5); the clearance through which the emulsified fuel must flow is determined ultimately by throttle position and vacuum slide height.



Mikuni BST 34 Carburetor Exploded View

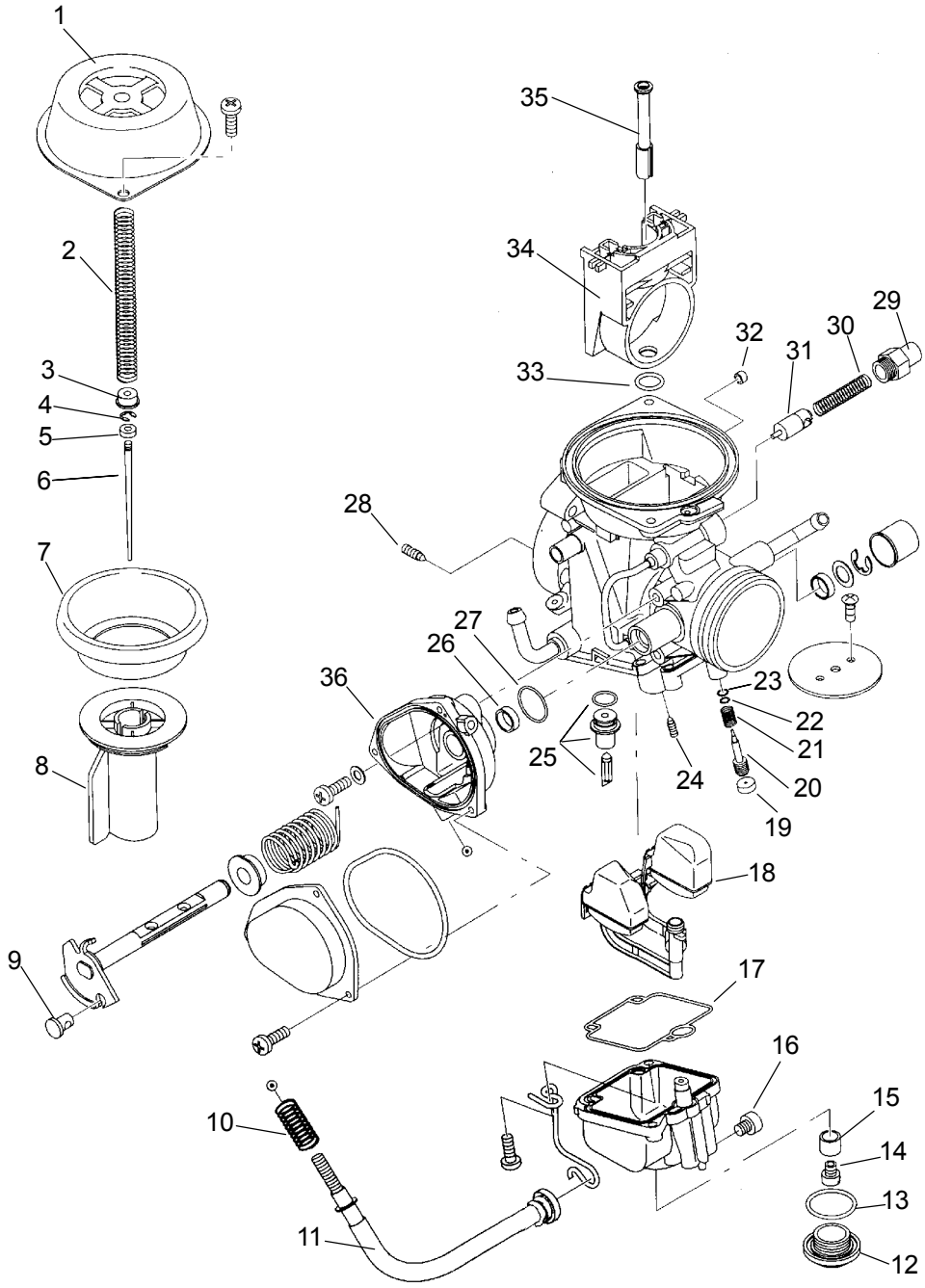


Refer to Page 4.5 for Jet Part Numbers



1. Carburetor Assembly
2. Screw
3. Throttle Valve
4. Cover, Diaphragm
5. Jet Block Assembly
6. Spring
7. Diaphragm Assembly
8. Ring
9. "E" Ring
10. Ring
11. Needle Jet
12. Cover
13. O-Ring
14. Throttle Shaft Assembly
15. Ring
16. Seal
17. Spring
18. Packing
19. "E" Ring
20. Cap
21. Screw
22. Drain Screw
23. O-Ring
24. Washer
25. Adjuster
26. Spring
27. Pilot Jet
28. Main Jet
29. Washer
30. Jet Needle
31. Float Assembly
32. Float Body Assembly
33. Float Pin
34. Needle Valve
35. O-Ring
36. O-Ring
37. Filter
38. Screw
39. Screw
40. Screw
41. Guide Holder
42. Spring
43. Plunger Assembly
44. Spring Washer
45. Screw
46. Air Jet
47. Cable Guide
48. Spring
49. Ring
50. Adjust Screw
51. Screw and Washer Assy.

Mikuni BST 40 Carburetor
Exploded View



1. Cover, Diaphragm
2. Spring
3. Spring Seat
4. “E” Clip
5. Spacer
6. Jet Needle
7. Diaphragm Assembly
8. Throttle Valve
9. Cable Guide
10. Spring
11. Adjuster Cable
12. Drain Plug
13. O-Ring
14. Jet, Main
15. Spacer Ring
16. Drain Screw
17. O-Ring
18. Float Assembly
19. Plug
20. Pilot Screw
21. Spring
22. Washer
23. O-Ring
24. Pilot Jet
25. Valve, Inlet Needle
26. Shaft Seal
27. O-Ring
28. Air Jet
29. Choke Plunger Guide
30. Spring
31. Choke Plunger
32. Cap
33. O-Ring
34. Jet Block Assembly
35. Needle Jet
36. Case

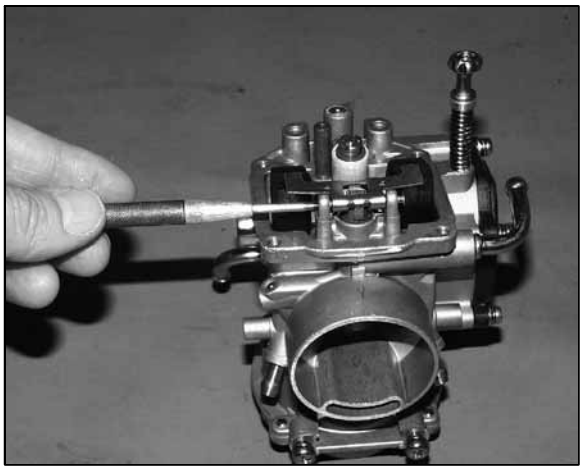
Refer to Page 4.5 for Jet Part Numbers

FUEL SYSTEM/CARBURETION
Carburetor Disassembly Notes- Mikuni CV

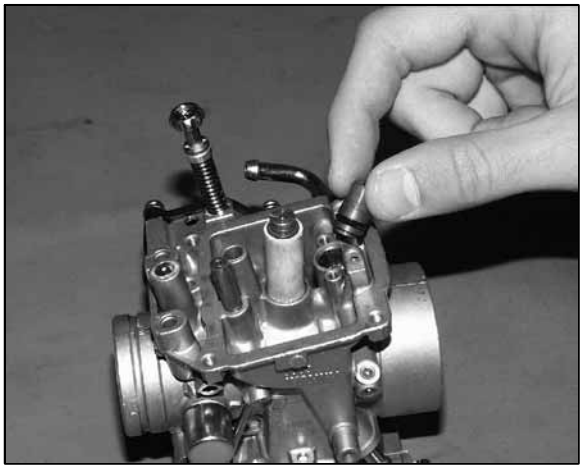
Use the following disassembly, assembly, and inspection techniques to service a CV carburetor.

1. Remove carburetor diaphragm chamber cover with a ratchet style screwdriver. DO NOT use an impact driver to remove the screws or carburetor may be permanently damaged.

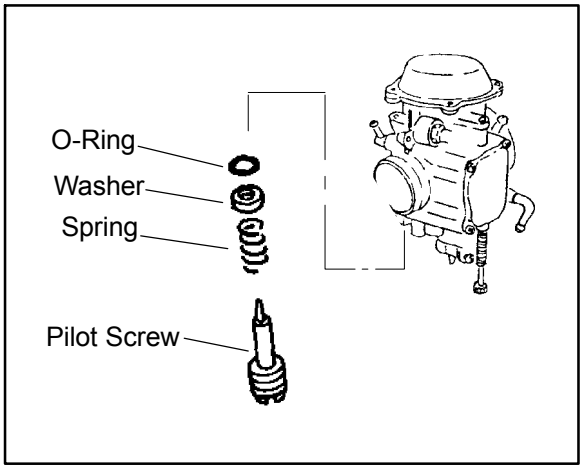
2. Use a small spring loaded center punch to remove pressed float pin.



3. Remove inlet needle seat retaining screw along with plate, and carefully remove needle seat. **NOTE:** Do not use a pliers to remove the seat or permanent damage may occur.



4. Do not misplace the pilot mixture screw, spring, flat washer, or O-Ring. If anti-tamper plug is installed in pilot screw cavity, refer to Maintenance chapter 2 for removal procedure.



5. **NOTE:** The starter jet is not removeable.

Carburetor Cleaning

1. Thoroughly clean the carburetor body, jets, and all passages with carburetor cleaner or electrical contact cleaner.

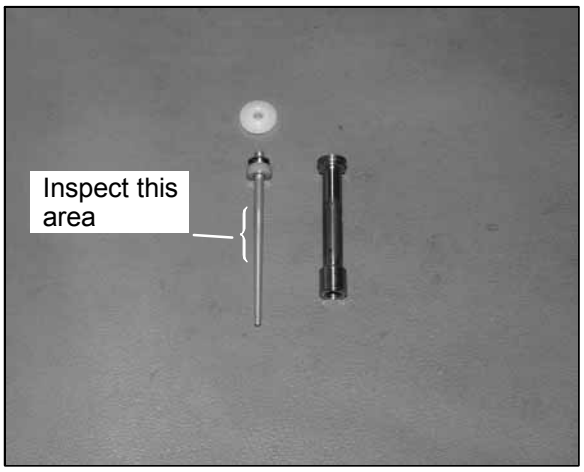
⚠ WARNING

Protect eyes from contact with cleaner. If you get cleaner in your eyes or if you swallow cleaner, see your doctor immediately. Some carburetor cleaners are extremely caustic and extended periods of soaking can loosen the adhesive sealer on the passage drill-way plugs. *Do not* soak rubber or plastic components (such as the vacuum slide diaphragm, needle seat screen, or O-Rings in caustic cleaning solutions. Irreparable damage may occur. Do not use agitator type carburetor cleaning equipment. Rubber parts must be cleaned with mild detergent and hot water only.

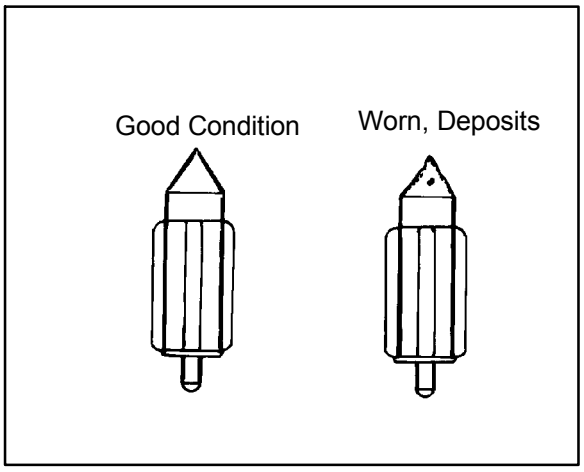
2. If the carburetor is extremely dirty or contaminated with fuel residue and varnish, soak for short periods only in carburetor cleaner, and rinse in hot water.
3. Replace the jets if they are extremely dirty or have a buildup of fuel residue or bacterial growth. Even a small amount of residue will reduce the flow characteristics of the jet.
4. Verify all passages and jets are unobstructed by spraying electrical contact cleaner through the passages. **CAUTION:** Do not use wire or welding tip cleaners on the jets as the orifice size may be altered.
5. Use low pressure air to dry carburetor body and all components.

Carburetor Inspection

1. Inspect jet needle and needle jet for wear. Look for discoloration, shiny spots, or and area that looks different than the rest of the needle. The middle to upper portion of the needle where it contacts the needle jet is the most likely wear point. If jet needle shows signs of wear replace both needle and needle jet to prevent a rich condition.



2. Inspect the inlet needle tapered surface for any sign of wear or damage. Be sure the spring loaded pin is free moving and returns freely when pushed. The inlet needle and seat should be pressure tested after assembly.

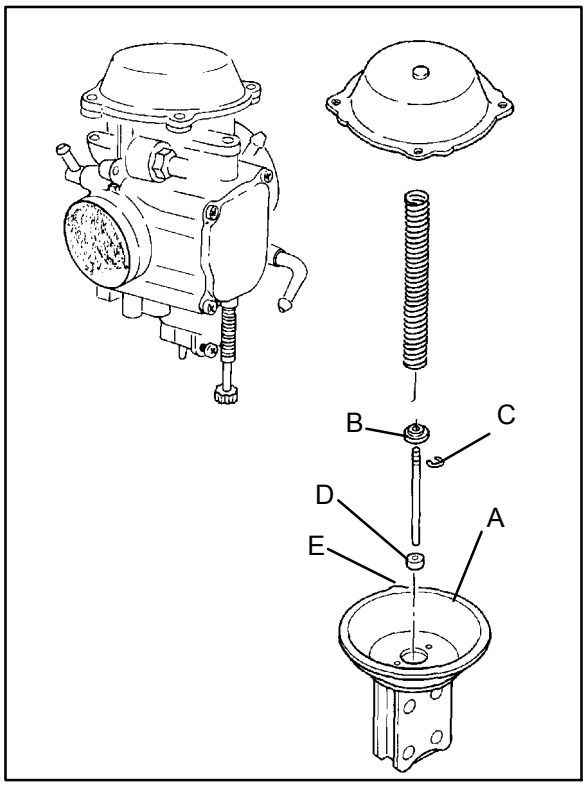


Carburetor Assembly

1. Inspect the diaphragm (A) for holes, deterioration, or damage. Make sure the diaphragm is pliable but not swollen. The diaphragm should fit properly in the carburetor body. Replace diaphragm assembly if diaphragm is damaged.

2. Replace parts in proper order. The spring seat washer (B) is stepped and must be placed on TOP of "E" Clip (C). Spacer washer (D) must be installed below the E-Clip. Refer to parts manual for more information.

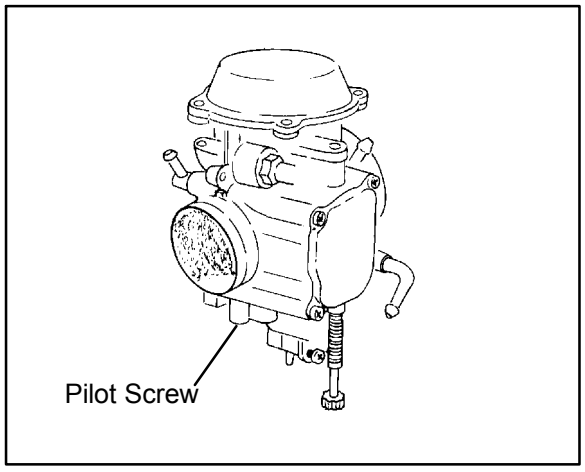
3. Be sure the tab (E) on outer edge of diaphragm is positioned properly in the carburetor body.



4. Install the pilot mixture screw, spring, washer, and O-ring as an assembly. Lubricate the O-Ring with oil or light grease before installation. **CAUTION:** Do not damage the O-ring during installation. Turn the screw in until it *lightly* contacts the seat. Back out the specified number of turns. NOTE: The final pilot (idle) mixture must be adjusted with the engine running. Refer to Page 2.12a.

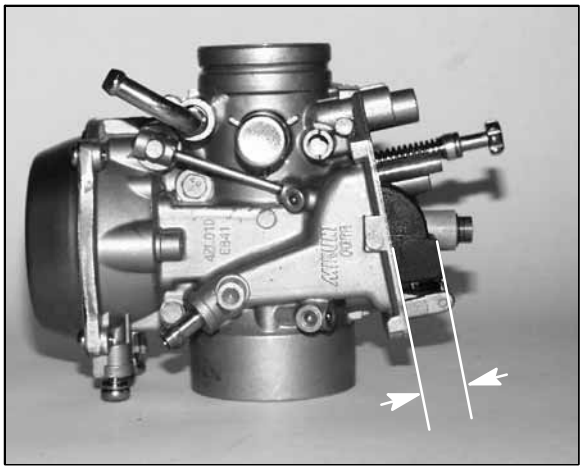
Pilot Mixture Screw Base Setting (Turns Out)

Refer to General / Specifications Chapter 1



Float Height Adjustment

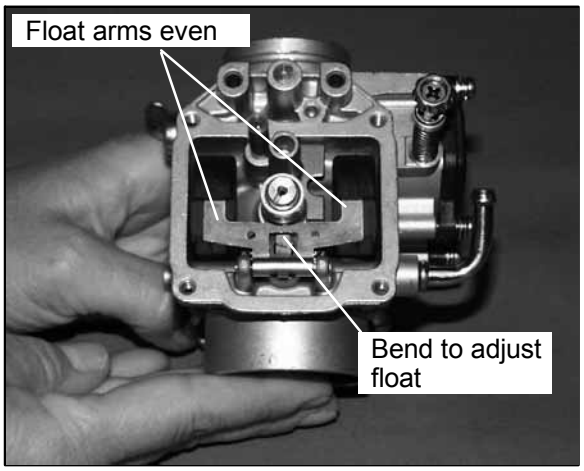
1. Place the carburetor on a level surface as shown at right to remove weight from float arm. In this position, the float tongue will rest lightly on the inlet needle valve pin without compressing the spring.



2. Measure the height from the float bowl mating surface to the top of step in float as shown. Both sides of float should be parallel to each other. The measurement should be made at the mid-point on the top of the float using float adjustment tool (PN 2872314) or a vernier caliper. When measuring the height be sure the inlet needle valve spring is not compressed.

Float Height:	
Std: BST 34	**13.0mm (.51″) ± 1 mm**
BST 40	**14.7mm (.58″) ± 1 mm**

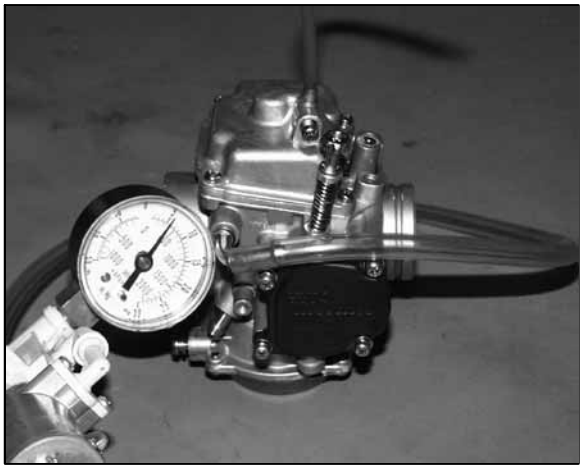
3. If adjustment is necessary, bend the tongue slightly. Be sure float arms are even on left and right side.



Needle and Seat Leakage Test

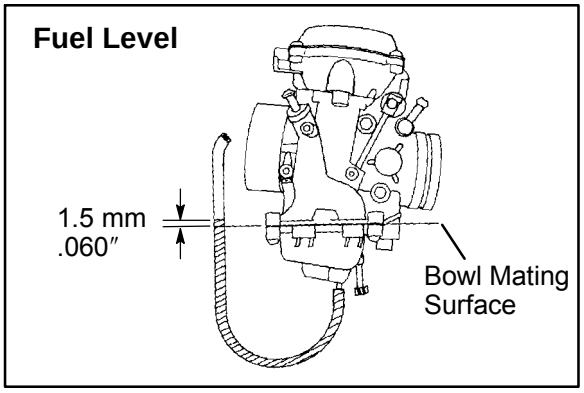
1. Install the float bowl. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring.

Mity Vac™ PN 2870975



Fuel Level

A fuel level test can be performed on some models if the drain hose fitting is accessible. Be sure to re-attach the bowl drain hose after performing the test. A fuel level test allows you to observe the height of the fuel in the float bowl without removing the carburetor. The fuel level can be observed with the engine either running or shut off, however, engine must run briefly to allow fuel level to stabilize. Be sure to review all fuel warnings on page 4.41 and 4.44.



1. Attach a clear line to drain fitting. Be sure line fits tightly on fitting. Position hose along side of carburetor as shown.
2. Open bowl drain screw by turning counterclockwise approximately two turns. Start and run engine for 3 to 5 seconds to allow fuel level to stabilize in the line. If level is out of specification, remove carburetor and inspect inlet needle and seat, float height, passages, etc.

Fuel Pump

4 Cycle models are equipped with a pressure regulated fuel pump (about 1-3 PSI). The pump is located under the headlight cover at the front of the machine or on lower left side of fuel tank (near oil tank). Refer to illustration on following page for fuel pump component identification.

To test the fuel pump:

1. Turn fuel off.
2. Disconnect impulse line from pump.
3. Connect Mity-Vac™ (PN 2870975) to the impulse line fitting on the pump.
4. Apply 5 inches (Hg) vacuum to the pump fitting. The diaphragm should hold vacuum indefinitely.

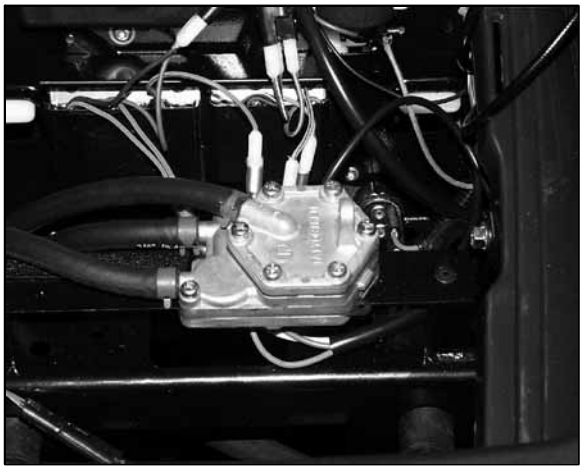
If fuel is present in the impulse line or vacuum chamber of the pump, the diaphragm is ruptured and the pump diaphragms must be replaced.

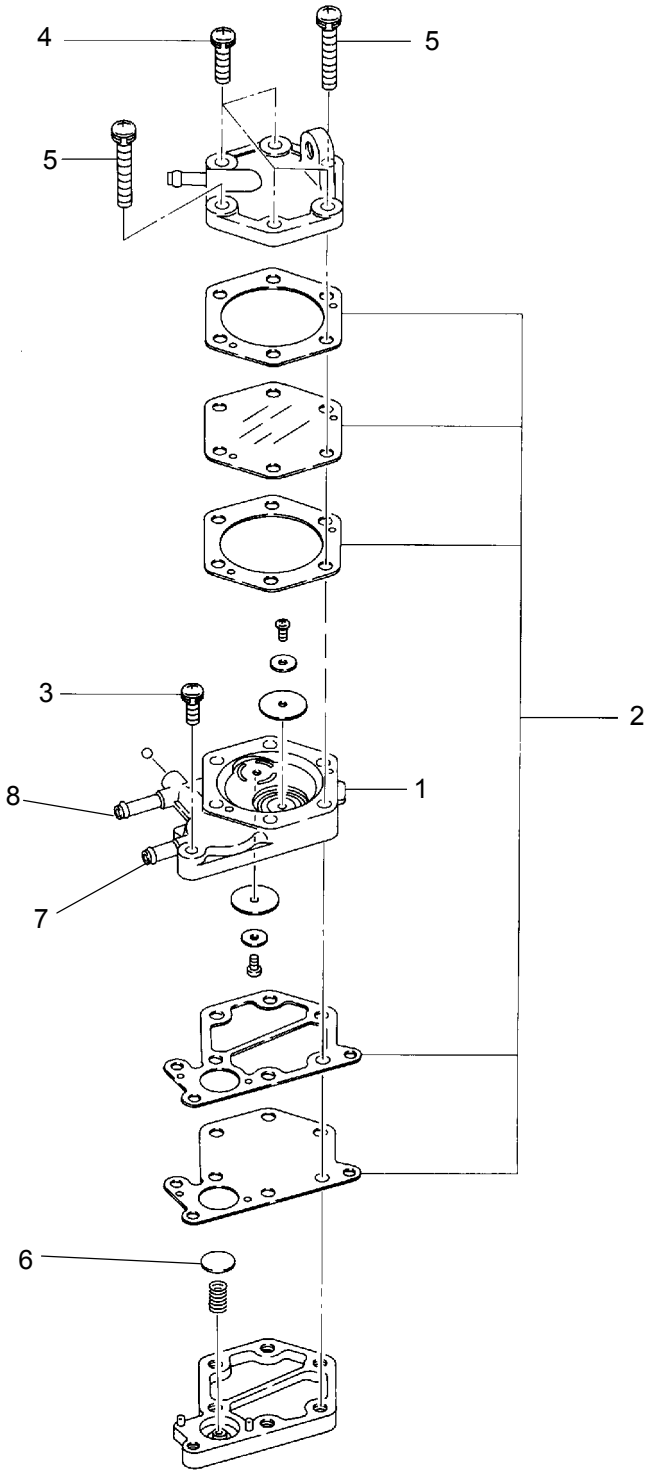
Fuel Pump Disassembly

1. Refer to illustration on following.
2. Remove the screws from the pump diaphragm cover. Note the location of the two longer screws.
3. Remove the diaphragm cover gasket, diaphragm, and valve body gasket.
4. Remove the outlet check valve cover, diaphragm, and gasket.

Fuel Pump Inspection/Assembly

1. Inspect inlet and outlet check valves for cracks, warpage or damage. Inspect the diaphragms for cracks, holes or swelling.
2. To clean the valves or pump body, remove the set screw and washer. Remove the valve and wash with soap and water. Carburetor cleaner may be used to clean the pump body when the check valves are removed. **CAUTION:** Some carburetor cleaners are very caustic and should not be used to clean the non-metal parts of the fuel pump.
3. Check the sealing surfaces of the pump body and covers. Carefully remove all traces of old gasket and check the surfaces for damage. Replace diaphragms and gaskets as a set.
4. Reassemble the pump in the reverse order of disassembly. Tighten all screws evenly.





Fuel Pump Exploded View

1. Fuel Pump Assembly
2. Diaphragm, Gasket Set
3. Screw and Washer Assembly
4. Screw and Washer Assembly
5. Screw and Washer Assembly
6. Pressure Regulator
7. Fuel Inlet
8. Fuel Outlet

Fuel Starvation/Lean Mixture

Symptoms: Hard start or no start, bog, backfire, popping through intake / exhaust, hesitation, detonation, low power, spark plug erosion, engine runs hot, surging, high idle, idle speed erratic.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel valve restricted
- Fuel filter plugged
- Carburetor vent line(s) restricted
- Plugged or restricted inlet needle and seat screen or inlet passage
- Clogged jets or passages
- Float stuck, holding inlet needle closed or inlet needle stuck
- Float level too low
- Fuel pump inoperative (4 Strokes)
- Air leak at impulse line (4 Strokes)
- Restricted impulse line (kinked, pinched) (4 Strokes)
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Ruptured vacuum slide diaphragm, Vacuum slide stuck closed or sticky (4 Strokes)
- Improper spring (4 Strokes)
- Jet needle position incorrect
- Incorrect pilot screw adjustment

Rich Mixture

Symptoms: Fouls spark plugs, black, sooty exhaust smoke, rough idle, poor fuel economy, engine runs rough/ misses, poor performance, bog, engine loads up, backfire.

- Air intake restricted (inspect intake duct)
- Air filter dirty/plugged
- Choke plunger sticking, incorrectly adjusted choke
- Choke cable binding or improperly routed
- Incorrect pilot air/fuel screw adjustment
- Faulty inlet needle and seat
- Faulty inlet needle seat O-Ring
- Float level too high
- Poor fuel quality (old fuel)
- Loose jets
- Worn jet needle/needle jet or other carburetor parts
- Dirty carburetor (air bleed passages or jets)
- Weak or damaged vacuum piston return spring (4 Strokes)
- Fouled spark plug

Poor Idle

Symptoms: Idle too high.

- Idle adjusted improperly/idle mixture screw damaged
- Sticky vacuum slide (4 Strokes) or throttle valve (2 strokes)
- Throttle cable sticking, improperly adjusted, routed incorrectly
- Choke cable sticking, improperly adjusted, routed incorrectly

Troubleshooting

Idle Too Low

- Choke cable bending or incorrectly adjusted
- Idle speed set incorrectly
- Idle mixture screw misadjusted or damaged
- Belt dragging
- Ignition timing incorrect
- Worn jet needle/needle jet

Erratic Idle

- Choke cable bending or incorrectly adjusted
- Throttle cable incorrectly adjusted
- Air leaks, dirty carburetor passages (pilot circuit)
- Pilot mixture screw damaged or adjusted incorrectly
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark plug fouled
- Idle speed set incorrectly (speed limiter)
- Worn jet needle/needle jet